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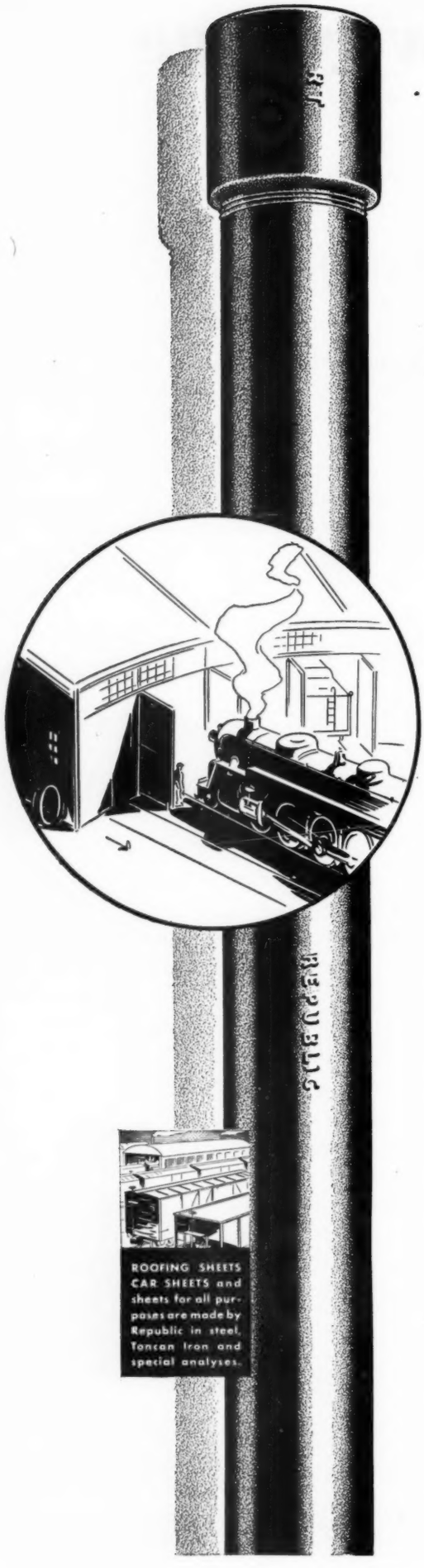

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RAILWAY AGE

Railway Prospects Are Improving

The trend of general business has been more sharply upward since early in July than during the latter part of summer in any year since the depression began. Car loadings have almost continuously, week by week, made more than seasonal increases. In the nine weeks ending with the middle of September they increased less than 3 per cent in 1930, declined 2 per cent in 1931, and increased almost 17 per cent in 1932, 1 per cent in 1933 and 7 per cent in 1934. During the same period in 1935 they increased almost 24 per cent, or from 566,488 in the week ending with July 13 to 700,357 in the week ending with September 14. As a result of this rapid increase they were, in the week ending September 14, not only larger than in the corresponding week of any of the preceding three years, but less than 6 per cent smaller than in 1931. The prospect is, as predicted by the *Railway Age* two weeks ago, that they will be larger in the last one-third of the year 1935 than in any year since 1930.

The increase in weekly loadings between the weeks ending July 13 and September 14 was 133,869 cars. Of this increase, 63,080 carloads consisted of coal, the shipments of which in the first two weeks of September were the largest for the same period since 1930. Passage of the Guffey coal bill and fear of labor troubles in the coal mines were partly responsible for the large increase in coal shipments. There were large increases also, however, in loadings of grain, live stock, lumber, miscellaneous freight and l.c.l. merchandise. On the whole, the increase in loadings indicates improvement in business all along the line since midsummer.

Increase of Farm Purchasing Power

What is the improvement due to? Will it continue? One of the major causes is the increase in farm purchasing power. In June, 1933, when the first "recovery" measures were passed by Congress, wholesale prices of all commodities averaged 93.1 per cent of what they did in June, 1913, while the similar index number of wholesale prices of farm products was only 74.4 per cent. It was plain that one of the principal requisites of recovery was to increase farm prices much more than other prices. Between June, 1933, and June, 1934, the index number of all wholesale prices increased 15 per cent and of farm prices 19 per cent. NRA increased industrial production costs and prices too fast for farm prices to catch up. Between June, 1934, and June, 1935, however, the index number of all commodity prices increased only 7 per cent and of farm prices 24 per cent. Consequently, in June, 1935, the index number of all commodity prices was 114.3, an increase of 23 per cent, and the index number of farm prices was 109.5, an increase of 47 per cent, since June, 1933.

This advance of farm prices approximately to a pre-war parity with other prices was due to drouths and government policies restricting agricultural production. The government policies contributing to the result have been much criticised. The resulting increases in prices of food are causing much complaint. This paper believes that, especially for the long pull, policies that would have enlarged the markets, domestic and foreign, for farm products would have been preferable to policies of restricting production. But in the interest of industry as well as agriculture something had to be done to increase farm purchasing power, because the farmers and rural communities are the largest single potential market of industry. The artificial farm measures adopted may be made temporary by decisions of the Supreme Court; they may ultimately do more harm than good; but at present they are helping business by increasing the demand for industrial products.

NRA Decision and Motor Regulation

Another cause of the business improvement is the Supreme Court's decision destroying NRA. There do not appear to be occurring extensive changes in wages, working hours or prices as a result of it. Perhaps the changes occurring are greater than superficially appear. At any rate, the decision has given business men, large and small, more freedom to do what they individually consider necessary to reduce their production costs and increase their sales. How the trend of business will be influenced as the Industrial Disputes Act, the Guffey coal bill and other similar legislation passed during the recent session of Congress become effective, cannot be anticipated.

The improvement of general business, and consequent increase of car loadings, are giving the railroads the principal thing they need—an increase of gross earnings. The net earnings reported by them for August and September will be relatively larger than those reported for July, and, if the business improve-

ment continues, their net earnings in the last one-third of the year will compare favorably with those made during the corresponding part of recent years. As time passes they will be more benefited also by the motor carrier regulation bill, which nominally goes into effect on October 1, than most persons now seem to believe. The regulation of motor carriers will eliminate the cut-throat competition to which both the railways and regular motor lines have been subjected by truckers who have gone from territory to territory, wherever there has happened to be seasonal business, making whatever rates would temporarily enable them to get traffic. It will promote co-operation in service and rates between the railways and established lines of motor carriers, and probably will result in increased operation of trucks by many of the railways themselves.

Excessive Operating Costs and Needed Railroad Buying

The railways need reductions of operating costs, however, as much as an increase of gross earnings. In April, May and June, the first quarter during which the restored pre-depression wages were in effect, their gross earnings were about $5,300,000 larger than in the same months of 1934, while the wages paid by them amounted to $29,300,000 more, although they had reduced the number of their employees by 42,000. In this quarter of 1934, wages were less than 47 per cent of gross earnings, while in 1935 they were 50 per cent of them. The *Railway Age* is not an advocate of low wages. It believes that every industry should pay as high wages as are consistent with general business conditions—that in periods of prosperity wages should be advanced in proportion to prosperity to help maintain prosperity. But present conditions are not those of prosperity. Because of losses of traffic and high operating expenses the railways are terribly unprosperous. For them to continue to pay present wages, or to be asked or required to pay them, under present conditions of business in general and of railroad business in particular, is a travesty upon economics. It threatens a large part of the industry with bankruptcy, curtails railway employment, and, by curtailing railroad buying, curtails employment in other industries.

The situation with respect to railroad buying is unprecedented. In June and July, with car loadings averaging 42 per cent less than in 1925-1929, the number of idle freight cars reported was the smallest since 1929. This was principally because since midsummer 1930 the number of railroad-owned cars had been reduced by 430,000. If car loadings should continue to increase relatively as fast as they have recently they would exceed 760,000 weekly in October, which would be 200,000 weekly more than in July. This does not indicate there would be a "car shortage," but it does indicate that if business continues to improve the railways will need to do much more spending for equipment and other facilities chargeable to capital account than they are doing now. How are they going to be able to do it if their net operating income continues to be unduly depressed by excessive operating costs?

Railway prospects are better than for some time, because general business and its prospects are better. Whether the improvement that has recently occurred will continue is conjectural in view of the repeated fluctuations that have occurred within the last three years. Everything possible should be done to continue the improvement; and betterment of the situation of the railways through increase of their gross earnings and reduction of their operating costs is one of the important essentials to a real, substantial and lasting improvement.

Improving the Protection at Automatic Interlockings

The collision at a railroad crossing protected by an automatic interlocking at Morning Sun, Iowa, on June 13, constitutes no indictment of automatic interlockings as such. The installation of automatic interlockings has increased rapidly since they were fully developed some 15 years ago, until more than 300 such plants are now in service in the United States and Canada. Many of these plants protect heavy high-speed traffic on one or both of the crossing lines.

In the Morning Sun accident, according to the evidence, a freight train approaching the crossing at a speed of about 20 m.p.h. received a proceed indication at the home signal and continued towards the crossing. In the meantime a passenger train on the other line, approaching at a speed of 40 to 45 m.p.h., arrived at the crossing first and was struck by the freight train. The Bureau of Safety concluded that the engineman of the passenger train failed properly to observe and obey a signal indication governing the movement of his train over the crossing.

It is, of course, beside the point to contend that if enginemen fail to observe and obey signal indications, no kind of signal or interlocking protection will prevent accidents. The important point is to determine the causes of this accident and institute measures to prevent a recurrence at this and other interlockings. One supposition which might be drawn from the evidence presented in the report, is that the engineman of the passenger train, who was not regularly assigned to this run, "overlooked his hand" in approaching Morning Sun at such a speed that he could not conveniently reduce to the 20 m.p.h. specified for the crossing. Again, he may have seen the freight train in time to have stopped short of the crossing, but in view of the fact that his train was already late, the engineman may have decided that he could "bluff" the engineman of the freight train to stop to let the passenger train proceed over the crossing first without stopping. Whatever the facts, the possibility of such procedure points to the desirability of providing some means of checking the

operation of trains with reference to the clearing of signals.

One ready answer is that if derails had been in service, the engineman of the passenger train might have been more cautious; in any event, the use of derails would have eliminated the possibility of an engineman attempting to "bluff" his way over the crossing when he knew a train was approaching on the opposing road. However, it is a well-recognized fact that main-line derails, except under special circumstances, create more hazards than they prevent. The idea of using derails to enforce obedience to signals, in lieu of adequate supervision, was discarded years ago, and the Association of American Railroads has gone on record as opposing their installation in main lines. Another means of checking train operation with reference to signal indications is to provide a smashboard on each home signal, which, although used at automatic interlockings in some states, is rather clumsy and difficult to operate satisfactorily.

A more modern and efficient means of checking the speed of trains and the sequence of train movements with reference to the time signals cleared is provided by an automatic graphic recorder. At least two states, Texas and California, require the use of such recorders at automatic interlockings, and in other states some roads voluntarily install a recorder at each automatic plant, on the theory that if enginemen know that the operation of their trains is being checked, they will take more care to conform with speed restrictions and observe signal indications.

Approaching the improvement of automatic interlockings from another angle, the Morning Sun accident suggests the desirability of replacing non-operative distant signals with operative signals. One argument often advanced for using non-operative distant signals is that train speeds over approach sections are limited by reason of the fixing of maximum speeds over the crossings. The defect in this contention is the fact that the rules are not always obeyed. In the Morning Sun accident, for example, the passenger train engineman was not on his regular run, and the train was late; as a result of these and other circumstances, he approached the crossing, according to the preponderance of evidence, at a speed of 40 to 45 m.p.h. A non-operative distant signal, like that in service at Morning Sun, provides no information as to whether the plant is lined up for a train. As a result, the engineman must observe and act upon the aspect of the home signal after he enters the approach control section and comes within sight of the home signal. The approach control section at Morning Sun was 2,500 ft. long, which may be sufficient for speeds of 20 m.p.h. but is not long enough for speeds of 40 m.p.h. or more. An operative distant signal, on the other hand, affords an engineman advance warning so that he can control the speed of his train when approaching the distant signal.

An automatic interlocking, whether installed at a crossing not previously protected and thereby eliminating train stops, or installed to replace a manually-operated plant and thereby reducing operating expense, will effect such decided savings that the provision of the most complete protection available is justified. The provision of such features as will not only improve train operation, but also prevent accidents, is also highly desirable at automatic plants, as a matter of policy. In view of these facts, it would seem advisable to provide such accessories as graphic recorders and distant signals at all automatic plants, except where special conditions preclude their use.

Simpler Freight Accounting

The Joint Committee of Traffic Executive and Accounting Officers, under the chairmanship of E. R. Woodson, has issued its "Interim Division Basis No. 2", covering an agreement as to the basis of interim divisions of through freight rates between participating railroads, pending final determination of divisions on all traffic where no agreed basis of divisions has been provided.

The circular provides for the expression of all future divisions (and, where practicable, existing divisions as well) in simple percentages of the through rates. It also provides, where joint through rates are established as substitutes for combination rates and no divisions have been agreed upon, that line-haul revenue shall be divided on a revenue prorate, using the former line-haul earnings as factors subject to definite regulations which are set forth in the circular.

It is heartening thus to see progress being made in simplifying the bewildering and expensive perplexities of accounting for freight revenues—even though it might be wished that the progress should be rather more rapid. The long period which now elapses before freight accounts are closed so that the railroads never know finally just where they stand financially, the endless correspondence and reauditing, the occasions for misunderstanding between railroads which arise from the complexity of freight accounting—all these are definite evils in themselves, quite aside from the cost of existing complexity which the railroads can ill afford under present conditions.

The task of the Joint Committee of Traffic and Accounting Officers is a highly technical one, the details of which will concern few persons even in the accounting and traffic departments. Thoroughgoing simplification of these accounts would save hundreds of thousands, possibly even millions in accounting expense, however, and pay perhaps even larger dividends in promoting harmonious relationships among railroads. The work of the Joint Committee, therefore, merits recognition and co-operation throughout the industry. There is nothing the railroads need so much as a united front to face the fight that they have to face together. Anything which tends to promote inter-railroad harmony has a value quite outside dollars and cents, important as that consideration is.

Boston & Maine Installs New Signaling and Remote Control

C.T.C. installation at Waltham, Mass., extended 12 miles west to include control of two layouts formerly requiring mechanical interlockings—Old automatics replaced on 53.2 miles of line

Automatic in Approach to Home Interlocking Signal

CODED-TYPE centralized traffic control apparatus has been installed by the Boston & Maine to control switches and signals that were formerly included in two mechanical interlockings. In the new arrangement, the switches and signals in these outlying interlockings are controlled from a new panel that has been added to an existing C.T.C. machine at Waltham, 9.9 miles west of Boston.

In the first of the interlocking layouts included in this project at West Concord, 12 miles west of Waltham, a single-track line of the New Haven crosses the B. & M. The 32-lever mechanical interlocking at this crossing was replaced by new power interlocked signals, which are controlled from Waltham. The hand-throw switches for three crossovers and two turnouts on the B. & M. in this layout, which were formerly equipped with bolt-locks operated from the mechanical machine, are now equipped with electric locks also controlled from Waltham. At this plant, new searchlight-type signals were installed on the B. & M. while power semaphore signals are used on the New Haven.

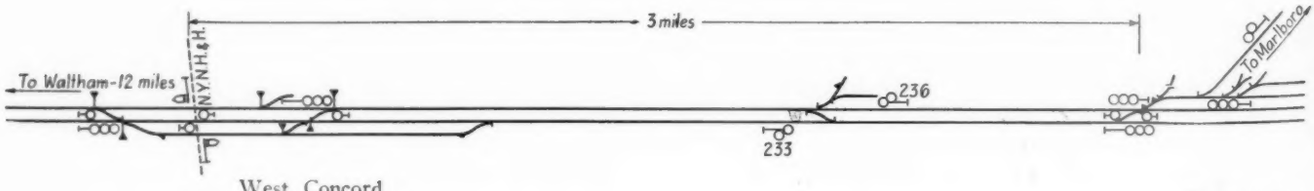
Outlying Junction Control

At South Acton, 15.2 miles west of Waltham and 3.2 miles west of West Concord, a single-track line turns off to Marlboro. A mechanical interlocking at this junction had been out of service for some time, the switches being hand thrown. The track layout at this point includes a main-line crossover and a junction switch, as well as the signals, as shown on the plan. In view of the fact that the junction is used by about 10 branch-line trains daily, the delay to these trains, as well as to main-line trains when branch-line trains were in the vicinity, made it desirable to have the junction layout interlocked and power switches and signals were installed, controlled from the C.T.C. machine at Waltham.

The territory from Waltham westward through West Concord and South Acton is double track, using right-hand running. Train orders are in effect on this territory. Therefore, the new power layouts at West Concord and South Acton are properly designated as remote control rather than C.T.C., although these improved power layouts, controlled by code equipment, are in fact controlled from the C.T.C. type machine at Waltham, which is used also to control two remote control interlockings on the 8.6 mile multiple-track territory from Waltham east to Tower-H, Somerville.

The Control Machine at Waltham

At the time the C.T.C. machine was installed at Waltham in 1932, a blank section was inserted to provide spare space for a future panel to control the layouts at West Concord and South Acton. This panel is 26 in. long and 18 in. high, and is set at an angle with the older section so that the operator can reach all of the levers without leaving his chair. The additional panel, as shown at the left in the illustration, consists of the illuminated track plan at the top, below which are the six signal levers and the seven switch levers. The levers are of the rotating type, the signal levers, operating to the left or right, being normally on center, while the switch levers operate to two positions. The signal indications are repeated by lamps representing the signals on the track diagram, and the switch indications are shown on the face of the switch levers. Separate sets of "power-off" or "power-on" indication lamps are included at the top of the panel to show whether a-c. power is feeding locally at West Concord and at South Acton. In addition to the lamp indications, a bell rings



when power is cut off at either of the outlying remotely-controlled interlockings.

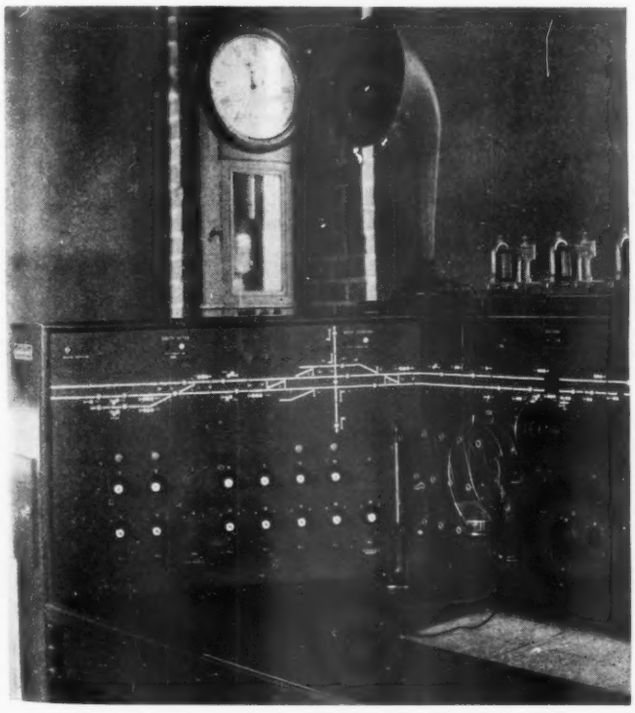
The control of the functions in the field is effected by the code system, using the General Railway Signal Company four-wire system, in which control codes can be sent out at the same time that indication codes are being returned to the office. These control wires are included as two twisted pairs with an additional twisted pair as spare in the aerial line cable, which handles all signal and interlocking line control circuits in this territory.

Automatic Signaling Modernized

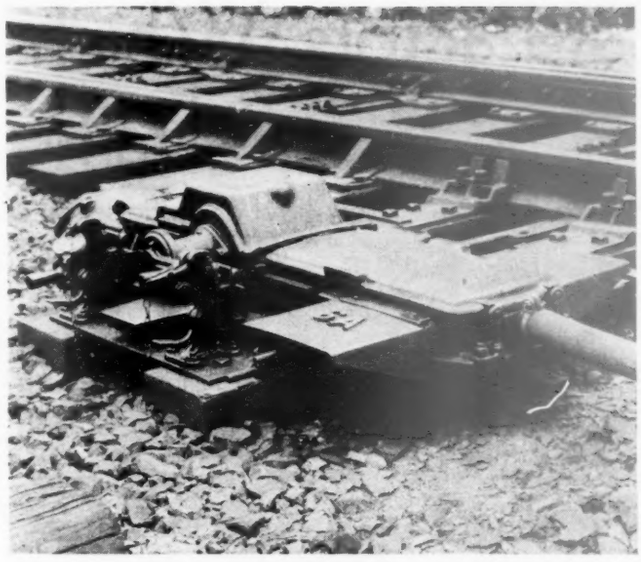
The territory from Waltham westward through West Concord, and South Acton to East Fitchburg, 36.7 miles, was formerly equipped with two-arm, two-position lower-quadrant, d-c. semaphore automatic block signaling, installed in 1907. These signals were not properly spaced and they did not afford adequate aspects for modern train operating conditions on this high-speed heavy-traffic division. The traffic on this territory, under present conditions, includes 40 passenger and about 35 freight trains daily. Therefore, as a part of the signal improvement program, the old semaphore signaling was replaced by modern searchlight-type signals.

The old semaphores were spaced to provide blocks 4,000 to 5,000 ft. long. As the train operation in this territory involves mostly high-speed through movements, using double-track right-hand running, the new automatic signals in open territory are spaced for blocks about 6,000 to 7,500 ft. long on ascending grades, and 8,000 to 9,000 ft. long on descending grades, using three-aspect signaling. At interlockings, as well as for the blocks approaching interlockings, multiple aspects are used as required.

The system of color-light signal aspects used on the Boston & Maine is fundamentally based on the A.A.R. Code Rules and Aspects, as shown in the Signal Section Manual. These have been modified or added to in certain instances where it has been felt that improvements could be made or local operating conditions warranted such changes. It is primarily a speed-signaling system,



A New Section Was Added to the Left of the Control Machine at Waltham



Switch Layout Showing Method of Extending Wires to the Machine

although to a certain extent it might be considered as a combination of speed and route signaling, inasmuch as all diverging routes require aspects indicating reduced speeds. The wide range of conditions necessitates, at some locations, three-block four-indication, or four-block five-indication signaling to avoid delaying traffic and to provide safe braking distances. The indications for three-block and four-block signaling are used only as required, and the system is flexible enough to permit passing from a two-block installation to a three-block or four-block installation or vice versa, without any confusion or difficulty.

Reconstruction Program

On account of the fact that the locations were so thoroughly rearranged and the old apparatus discarded, the improvement represented practically the equivalent of an entirely new signaling system, the bonding of the track joints being the only part of the old system that was incorporated in the new; even the old line wires were replaced by aerial line cables. On a second section of 16.5 miles of double track on the same line, from Tyter, Mass., to Montague, a similar replacement of old semaphore automatic block signals with modern color-light signals was carried out as a part of this general signal program. This territory is located from 35 to 52 miles west of Fitchburg.

The installation of the remote control at West Concord and South Acton, as well as the new automatic signaling was planned and constructed by signal forces of the Boston & Maine, the signal equipment being furnished by the General Railway Signal Company.

The Maine Central Transportation Company, highway subsidiary of the Maine Central, has obtained from the Maine Supreme Court a permanent injunction restraining the Old Colony Coach Line, Inc., and the General Terminal & Transportation Company from carrying intra-state passengers on certain routes out of Portland, Me., and Bangor. The complaint of the railroad subsidiary alleged that these independent operators were carrying intra-state passengers by selling interstate tickets at reduced rates and allowing the passengers to use such tickets for intra-state trips in Maine. The Maine Central Transportation Company holds certificates from the Public Utilities Commission of Maine for intra-state business over the routes in question.

Factors Which Underlie Railway Traffic Revival

Low level of traffic seen caused by decline in exports and in reduced production of basic commodities rather than in diversion to competitors

By John Leeds Kerr

Railroad Economist, Young & Ottley, Inc.

Part II*

HOW much freight was available to all carriers in 1932, the year which witnessed the low point of the depression? Excluding all traffic which is *unquestionably* "unavailable," a reasonable estimate would be about 1,036,000,000 tons divided as follows: railroads 62.4 per cent; trucks 20.2 per cent; crude petroleum pipe lines 7.4 per cent; gasoline pipe lines 0.4 per cent; and water carriers 9.6 per cent. Co-ordinator Eastman's report on traffic— which includes *all* "unavailable" traffic— suggests that in 1932 some 1,570,000,000 tons of freight were available to various carriers divided as follows: railroads 44 per cent; waterways 17 per cent; pipe lines 7 per cent; motor trucks 14 per cent; and 18 per cent consumed locally.

Truck Traffic Mostly Consumers' Goods

In 1928 traffic based on this report amounted to 2,330,000,000 tons with 60 per cent being available for the railroads; 18 per cent for the highways, 4 per cent for the pipe lines, and 18 per cent for highways and local consumption. The changing percentages indicate only the obvious fact that railroad traffic (representing mostly durable goods) will decline faster than motor truck traffic (representing mostly consumers' goods) in depression and advance more rapidly in a period of revival.

The following table shows the traffic in the United States for the year 1932 based on studies by this organization and the participation of each transport agency. This excludes certain waterway traffic, which never could have represented any kind of potential railroad haul under any circumstances, but includes the ore traffic on the lakes, the coal traffic on the rivers, and Panama Canal traffic despite the fact that much of this business would never have been available to the railroads. Inclusion of these figures does, however, clarify the general traffic picture.

Traffic in the United States—1932

	Average haul (Miles)	Rate per ton-mile	Tons of originated freight	Per cent of total	Revenue ton-miles	Per cent of total	Revenue	Per cent of total
Railroads	363	$0.01046	646,000,000	62.4	234,000,000,000	65.5	$2,485,000,000	83.0
Motor truck	100	.01200	210,000,000	20.2	21,000,000,000	5.8	252,000,000	8.5
Pipe lines:								
Gasoline	400	.01100	3,200,000	0.4	1,000,000,000	0.4	13,376,000	0.6
Crude	380	.00660	77,000,000	7.4	29,000,000,000	8.2	193,116,000	6.5
Water carriers	750	.00560	100,000,000	9.6	75,000,000,000	20.1	42,000,000	1.4
TOTAL			1,036,000,000	100	360,000,000,000	100	$2,985,492,000	100

From the foregoing it will be seen that the railroads originated 62.4 per cent of the freight, reported 65.5 per cent of the total ton-miles and 83.0 per cent of the total revenue. Although the water carriers reported 20.1 per cent of the total ton-miles they were able to participate in only 1.4 per cent of the total revenues. The companies engaged in handling domestic water line freight traffic actually reported only 48 million tons. But the U. S. Army reports that total traffic of this nature amounted to 272 million tons, although the Army figures, according to the Eastman report, obviously include a very large proportion of government traffic of a short haul nature, such as that between navy yards and industrial centers.

Floated and rafted timber to the extent of 8½ million tons was also included in the above estimate as well as local traffic in the New York harbor, on the San Francisco Bay, and on the waters of Puget Sound. Thus, there can be no question but that the 100 million tons of water borne freight considered herein is a liberal estimate of the possible traffic of this character which might conceivably be recaptured by the railroads. The crude petroleum movement in itself is of no great importance from the standpoint of diversion since the railroads never handled any appreciable volume of this commodity.

In its summary of the traffic situation today the Eastman Report said:—

> It would appear that from a tonnage standpoint, carriers other than highway operators have lost approximately 15 per cent of the traffic which they formerly handled. From a revenue standpoint this loss appears to be between 15 and 20 per cent. Assuming that the production of 1928 is one which may normally be expected over the period of the immediate future, the railroads can receive revenues only about 85 per cent as great as those which were received in 1928.

Durable Goods and the Railroads

The railroads have suffered severely during the depression years because of their dependence on durable goods. Once the heavy industries show substantial improvement the railroads should be able to receive revenues as great as they received in any of the pre-depression years. Railroads were slow to enter the motor truck field because investment on a large scale in supplement-

* Part I of this article appeared in the *Railway Age* of September 21, page 363. Its publication does not necessarily imply agreement by the editors with all its conclusions.

ary services seemed unwise until legislative and regulatory factors which might affect highway operations were clarified. The new motor transport regulation law opens the way for enlarged railroad subsidiary operations on the highway. It will also tend to eliminate finally the costly waste which resulted when hitherto unregulated motor operators slashed rates and the railroads had to meet them.

It seems self evident that, if the nation recovers, the railroads will recover, but not while heavy industries remain in a state of stagnation. Prosperity in this particular field is an absolute necessity if an upturn in railway traffic is to eventuate. Any recovery in the heavy industries to the average level for the 1923—1928 period would perhaps increase freight revenues by $400,000,000. Increased activity in consumers' goods has already stimulated certain durable lines. Moreover, expansion in the durable goods industries would provide additional stimulus for both coal and consumers' goods. Definite revival of railroad purchasing power would perhaps be the greatest single factor in bringing about recovery of commodity traffic in the durable goods line.

Motor Truck Competition

The question of traffic diversion to motor trucks obviously cannot be dismissed lightly as a matter of unimportance. Since 1929 the railroads have suffered a total loss of 640,000,000 tons of originated freight. The loss of 613,000,000 tons or 95.8 per cent of the total reduction resulted primarily because of world-wide depression, according to a painstaking check, and the loss of 27,030,000 tons or 4.2 per cent was directly attributable to motor truck competition.

Dispassionate analysis therefore, leads to the conclusion that motor truck competition, although serious, may be overemphasized; that with a return of business volume to the pre-depression level the railroads should regain more than 85 per cent of the resulting traffic either directly or indirectly through their own subsidiary operations, or through co-ordinated rail-truck movements. Today, for example, a Chicago motor trucking concern is moving demountable truck bodies by freight cars between Chicago and Davenport, Iowa, thus avoiding the congested highways in the Chicago industrial district. Most of the railroads are offering pick-up and delivery service and there has been a vast increase in the number of trucks owned.

The New York Central through the L.C.L. Corporation owns a large number of containers which are moved on flat cars and transferred from car to platform by lift trucks, cranes and other devices. Even refrigerator units are provided and the shipper is afforded a wide variety of containers. The Pennsylvania operates a large number of merchandise containers in regular station-to-station service in place of regular freight cars assigned for l.c.l. service. Under this arrangement any truck body not exceeding certain dimensions may be transported and moved freely from flat car to truck. Railroads are constantly adding to the number of trucks in service and it is definitely indicated that with any vital recovery in business the railroads will continue to strengthen and enlarge their interest in highway vehicles.

Diversion of Gasoline Traffic to Pipe Lines

Railroads do not haul any appreciable traffic in crude petroleum as already noted herein, but they have derived considerable revenue from the transportation of gasoline. Any diversion of importance since 1929 has therefore been due to the movement of gasoline by pipe line instead of by rail.

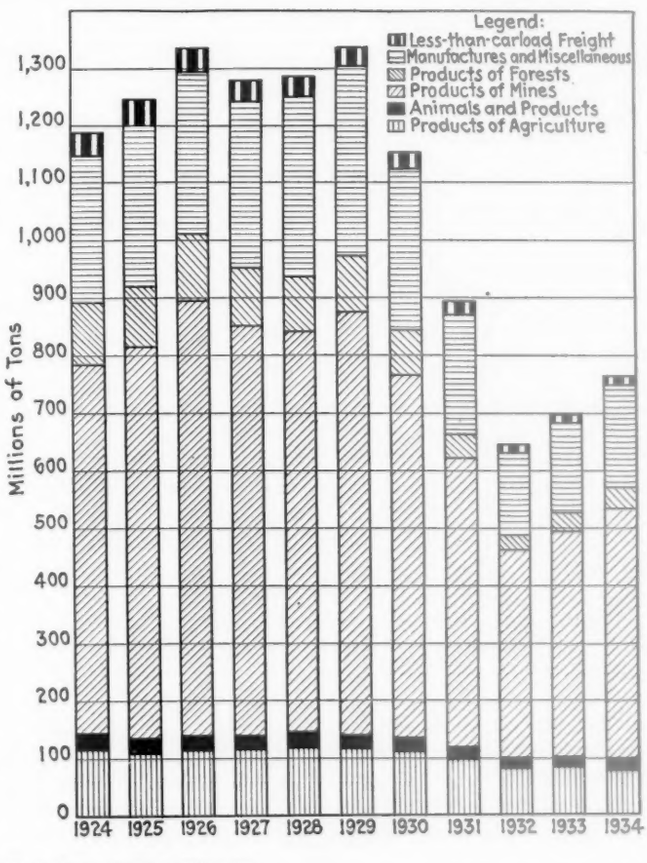
The total pipe line gasoline movement in 1933 may be estimated at approximately 32,000,000 barrels. There are approximately 252 pounds to the barrel and hence about 8 barrels per short ton. Thus, in 1933 there was perhaps a diversion of 4,000,000 tons in refined gasoline, compared with about 3,250,000 tons in 1932.

The total petroleum products transported in the United States in 1932 amounted to about 744,000,000 barrels. Of this amount water carriers originated 51 per cent, the railroads 45 per cent and interstate pipe lines originated about 3.3 per cent, or 24,900,000. In the Eastman report the cargo traffic of a railroad like the Chesapeake & Ohio is cited as a means toward increasing earnings. It is obvious that a solid train of 75 cars of coal moving to one destination will produce greater earnings than one which handles miscellaneous commodities in different types of cars destined to numerous stations. By the same token, a train load of 70 tank cars with inter-connecting hoses to be moved at a train load rate will not only be highly profitable but even bring back business diverted.

Tank car transportation started with crude petroleum and its refined products and in the long run such transportation may assume even greater importance than in the past. The pipe line is a special agency for moving petroleum and petroleum products in one direction over a fixed route. The railroads can move many commodities in either direction and its use is not as restricted as that of the pipe lines. The railroads will some day establish train load rates for the movement of gasoline. With lower rates we believe this traffic will return to the railroads.

Diversion to the Panama Canal

In 1929 there were 30,000,000 tons of freight moved through the Panama Canal or a little more than 3 per cent of the total freight tonnage handled by the railroads.



R. R. Dept., Young & Ottley, Inc.

Chart III—Tons of Freight Originated, 1924-34

In 1933 about 19,800,000 tons were moved. International traffic through the Canal declined sharply as a result of world depression, severely affecting revenues. But most of this business would never have been available to the railroads since a large proportion of the Canal business consists of freight in vessels which neither originated nor terminated in the United States. The transcontinental carriers have perhaps suffered the greatest loss from diversion of eastbound lumber traffic. Recently the Interstate Commerce Commission allowed western railroads to extend the 72c basic rate now in effect between the Pacific Coast and points in the Mississippi Valley to the Atlantic Seaboard. It is estimated that the volume of tonnage moving all-rail would be increased by 450 million board feet, the estimate being based on an assumed annual volume of 1 billion feet of lumber via water routes to the Atlantic Coast. This would mean an annual increase of 568,000 tons equaling 16,666 car loads and representing an increase in yearly gross of about $6,400,000.

Fourth Section Repeal

Frank W. Robinson, vice-president in charge of traffic of the Union Pacific has pointed out (*Railway Age*, November, 1934) that "diversion to the Canal of traffic formerly enjoyed by the railroads has placed a greater burden of support upon the remaining traffic . . . Operations of the railroads have been made more expensive by the unbalanced movement east bound as against west bound, resulting in the movement of empty cars and the movement of the locomotives west bound without loads on a substantial scale." He estimated that the repeal of the long and short haul clause, (Section 4 of the Interstate Commerce Act) however, would return only about $27,388,530 revenue, based on 1931, to the rail carriers as a whole. Railroads are now prohibited from making a lower rate between, let us say, New York and San Francisco than to intermediate points such as Ogden and Salt Lake City, irrespective of whether the lower rate is necessary if the railroads are to compete with water carriers for intercoastal business.

In many cases the Interstate Commerce Commission has granted relief—principally to western carriers—under the Fourth Section for a lower rate on specific commodities so that the railroads could compete for port-to-port traffic. Opposition to this policy has originated largely in the inter-mountain region, but many of the cities located in this section now recognize that their opposition has worked to their disadvantage because the railways were forced to reduce personnel at many intermediate points. The number of railroad employees in El Paso, Spokane, Ogden and Denver has declined. The rate advantages these cities obtained proved to be a boomerang and many who fought for the long and short haul clause are now in favor of its repeal. While the recovery of $27,000,000 would be beneficial, it certainly does not represent as much to the railroads as a whole, as it might mean to certain transcontinental lines.

Inland Waterway Competition

The railroads object to federal river transport operations because they have always been a political measure designed expressly for the purpose of obtaining votes in the Mississippi Valley states. The amount of tonnage diverted is not important, but the railroads have, with justice, fought the waterways consistently because of increased taxation and because the entire matter tended to depress the rate structure and threaten private operation. With a return in business to the 1928 level all carriers subject to waterway competition would perhaps still recover most of the traffic lost since the beginning of the depression. On the whole the importance of inland waterway competition has probably been exaggerated from the revenue standpoint, but the political aspects are unfavorable and will continue to be a depressing influence not only on the railroads but on all industries which resent government participation in private business.

Outlook for Coal Traffic

For almost a decade the coal industry has been experiencing a major period of technical transition. Although the industrial development of the country has been considerably advanced, coal consumption has not increased materially, and the decline in the volume of coal traffic has provided grounds for anxiety on the part of both coal producer and the railroads. Many of the southwestern roads are now utilizing fuel oil exclusively for locomotives, and the achievements of hydro-electric power have curtailed the consumption of coal in no small degree. Natural gas in many localities has been substituted for the cheaper grades of bituminous coal. The marginal producer in the coal industry now finds it more and more difficult to survive.

Coal traffic movement has been changed and existing coal arteries are entirely different from those which prevailed ten years ago. The anthracite roads have been severely affected not only by fuel oil and hydro-electric power, but from competition with coal originating in competitive territories. The Virginian, Chesapeake & Ohio and Norfolk & Western have invaded the New England market during the last decade, and there is no indication that the movement of Pocahontas coal via Hampton Roads to New England will be retarded by the passage of the Guffey Coal Bill. This same coal has been shipped to Canada to the disadvantage of all railroads serving union fields in Pennsylvania. The tremendous manufacturing activity in the Great Lakes section was responsible for the record-breaking traffic which prevailed during the last period of prosperity for railroads serving coal fields in eastern Kentucky, West Virginia and Virginia.

Notwithstanding the competitive substitutions of recent years, high grade bituminous coal will always find a ready market and the part that it plays in modern industry as an essential product consumed in manufacturing, definitely indicates that it will never be supplanted as an efficiency fuel. On the other hand, it is doubtful if anthracite production will ever reach the peak levels of previous years and the trend in all probability will continue downward. Many bituminous coal producers will find it more and more difficult to survive and perhaps even a great industrial revival will not bring back coal prosperity for all railroads. Individual carriers stand to benefit by the production of special purpose and high quality coals.

Conclusion

We are suffering from a world depression which has been more severe than any recorded in the history of modern civilization. Recovery is a logical prospect for the United States as well as other nations, and business indices including traffic may turn decisively upward without much preliminary warning. This recovery will come about when production of iron, steel, coal, lumber and cement regain the losses which have been so disastrous for industry since 1929 Concurrently with any improvement in production of raw material, a revival will *undoubtedly* occur in the manufacture of finished goods.

The recent domestic business revival in the United States has been exceeded by the economic recovery wit-

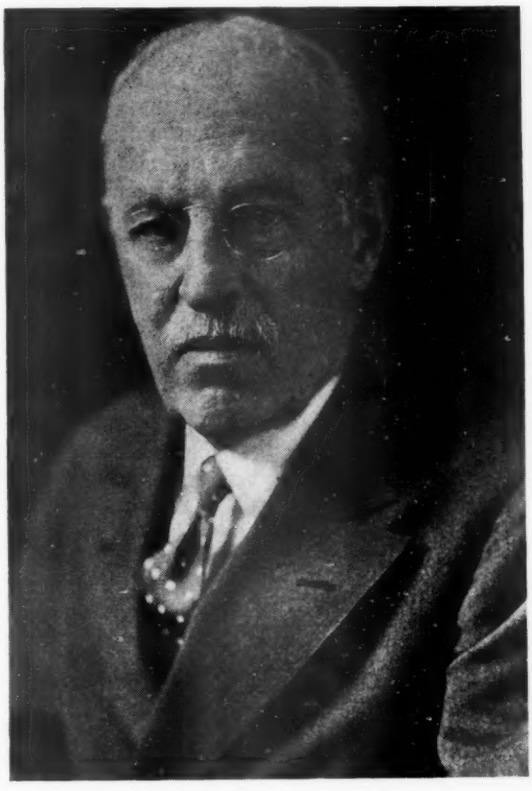
(*Continued on page 394*)

General W. W. Atterbury Dies

Retired president of Pennsylvania had been in poor health for more than a year

GENERAL W. W. ATTERBURY, who retired last April from the presidency of the Pennsylvania, died on September 20 at the Bryn Mawr (Pa.) Hospital. He was 69 years old and had been in poor health since July, 1934, when he underwent an abdominal operation; apoplexy following arteriosclerosis was given as the cause of his death.

General Atterbury, who became president of the Pennsylvania on October 1, 1925, after 39 years of association with the road, had not been active during the period following his July, 1934, operation. Thus at last April's organization meeting of the P.R.R. board of directors he announced his desire to anticipate his retirement next January under the company's age-limit rule and nominated as his successor Acting President M. W. Clement, who was elected as announced in the *Railway Age* of April 27, page 651. Mr. Clement, closely associated with General Atterbury during the latter's presidency, issued the following statement at the time of his predecessor's death: "General Atterbury has been my friend for so many years that it is utterly impossible for me to give expression to my feelings on his loss.



General W. W. Atterbury

"General Atterbury's contribution to the advance of American transportation, while it is fairly well known and recognized today, will not be fully appreciated in all of its far-reaching significance for years to come. He left a stamp of progressive development on American railroads that even his contemporaries, who were intimately associated with him, have not yet fully realized.

"He was one of the most far-seeing business executives of the country, recognized not only in his own field of transportation but in the industrial and economic field generally. He had the admiration and affection of every one who was privileged to know him.

"General Atterbury was the friend of all the employees of the Pennsylvania Railroad. Their interests were his interests, and one of his most prideful accomplishments was to give the employees of the Pennsylvania an equal voice with the management in the settlement of their mutual affairs."

William Wallace Atterbury was born at New Albany, Ind., on January 31, 1866, and spent his boyhood years in Detroit, Mich. He was graduated from Yale University in 1886 with the degree of Bachelor of Philosophy. He entered the service of the Pennsylvania on October 11 of the same year as an apprentice in the Altoona shops. From 1889 to 1892, he served as assistant road foreman of engines on various divisions of the Pennsylvania and the Philadelphia, Wilmington & Baltimore. In 1892 he was promoted to assistant engineer of motive power for the Pennsylvania Company's Northwest System. From 1893 to October 26, 1896, he was master mechanic for the Pennsylvania Company at Fort Wayne, Ind. On the latter date, he was promoted to superintendent of motive power of the Pennsylvania Railroad with headquarters at Altoona, and on October 1, 1901, was advanced to the position of general superintendent of motive power of the Pennsylvania Lines East of Pittsburgh and Erie.

General Atterbury's affiliation with the transportation department dates back to January 1, 1903, when he was appointed general manager of the Lines East of Pittsburgh and Erie. On March 24, 1909, he was elected fifth vice-president in charge of transportation and on March 3, 1911, upon a change in the organization, he was elected fourth vice-president and a director. The practice of designating the several vice-presidents by number was discontinued on May 8, 1912, at which time Mr. Atterbury was elected vice-president in charge of operation, his jurisdiction still covering at that time the Lines East of Pittsburgh. From May 17, 1916, to June, 1919, he was also president of the American Railway Association, in which connection he rendered invaluable service to the United States government in connection with the transportation of troops and war supplies to the Mexican border as well as to the Atlantic seaboard.

Shortly after the United States entered the World War Mr. Atterbury was requested by Secretary of War Newton D. Baker to go to France and assume charge, as director-general of transportation of the American Expeditionary Forces, of the details of organization of the American railway transportation facilities in France. Mr. Atterbury sailed for Europe in August, 1917. On October 5, 1917, he was commissioned a brigadier-general and his appointment as such was confirmed by Congress three days later. General Atterbury returned to the United States on May 31, 1919, and was awarded the distinguished service medal of the United States, he was also made a commander of the Legion of Honor by France, a companion of the Most Honorable Order of the Bath by Great Britain, and a commander of the Order of the Crown by Belgium.

Upon the termination of federal control, General Atterbury resumed his duties as vice-president in charge

of operation of the Pennsylvania, but this time having jurisdiction over the entire system as a result of the creation of the new plan of organization into regions. He continued in this capacity until November 15, 1924, when he was elected vice-president of the corporation without designation, so that he might act in a more general executive capacity, aiding the president in his absence. On October 1, 1925, he was elected president to succeed Samuel Rea.

One of General Atterbury's greatest management accomplishments was the $200,000,000 electrification of the Pennsylvania from New York to Washington. The acquisition by the Pennsylvania of interests in air lines and bus companies reflected his belief that railroads should offer all forms of transport.

General Atterbury was an honorary member of the American Society of Mechanical Engineers, a member of the American Society of Civil Engineers, the American Academy of Political and Social Science and the American Philosophical Society. He had been awarded honorary LL.D. degrees by the University of Pennsylvania (1919), Yale University (1926), Villa Nova College (1927), and Temple University (1929).

Factors Which Underlie Railway Traffic Revival

(*Continued from page 392*)

nessed in varying degrees within many other countries during the past two years. Thus far the general recovery has not been accompanied by an expansion of world trade as a whole. This may be attributed to the spirit of intense nationalism reflected by the leaders of many world powers and innumerable political panaceas introduced throughout the world in recent years. International trade will not expand appreciably until the relationship of world currencies is established upon a basis which affords reasonable hope for the consummation of a business transaction without undue risk American industry and agriculture have been seriously upset by our lost export markets, and as a result of the government's policy with respect to cotton prices fixed by the AAA, the market for our leading exportable crop appears to be permanently in jeopardy.

The United States, as a highly industrialized nation, requires markets which transcend political boundary lines and reach to all corners of the earth. The urge for greater efficiency and lower costs of production leads to specialization, which in turn necessitates broad markets if maximum profits are to follow. For some commodities nothing short of a world market justifies the specialization and mass production which have characterized American industry during the last decade.

As conditions through the world improve, however, it is possible that extremes in the way of nationalism, tariff barriers and general unrest may be ameliorated and give way to a new period of greater understanding between world powers. The inventive genius of our people will continue to play a major role in our domestic prosperity and will sooner or later almost force an increase in world trade through the development of important new markets.

It is conclusively evident that the unprofitable traffic volume of today is directly attributable to the great decline in the volume of goods produced for domestic or foreign consumption and results only in a minor degree from competition by trucks, waterways or any diversion. The railroads with 100 years of experience should be able to circumvent the new problems which must be met as a result of severe economic dislocations which have resulted from world-wide depression. Although other modern day innovations may tend to becloud the importance of the railroads, there can be little question that at least three-quarters of the nation's freight will continue to move by rail for many years to come.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended September 14 totaled 700,357 cars, the highest figure reached since November 7, 1931. This was an increase of 107,571 cars as compared with the total for the preceding week, which included the Labor Day holiday, and an increase of 52,872 cars as compared with the corresponding week of last year. It was also an increase of 40,271 cars as compared with 1933. Although coal loading has been stimulated in recent weeks by anticipation of a strike of the bituminous miners and showed an increase of 20,445 cars as compared with last year, an even greater increase was shown in the loading of miscellaneous freight, which amounted to 37,311 cars more than in the corresponding week of last year. Live stock was the only commodity classification to show a decrease under last year's figures and all classifications showed increases over the week before. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, September 14

Districts	1935	1934	1933
Eastern	144,684	134,918	144,329
Allegheny	130,292	115,260	129,264
Pocahontas	53,496	44,147	47,673
Southern	98,105	87,321	87,039
Northwestern	114,680	100,619	99,601
Central Western	104,528	105,754	98,003
Southwestern	54,572	59,466	54,177
Total Western Districts	273,780	265,839	251,781
Total All Roads	700,357	647,485	660,086
Commodities			
Grain and Grain Products	43,806	37,794	31,554
Live Stock	17,713	35,140	20,070
Coal	138,563	118,118	126,555
Coke	6,539	5,253	6,652
Forest Products	31,245	22,657	25,637
Ore	34,284	25,608	42,907
Merchandise L.C.L.	165,829	163,978	172,784
Miscellaneous	262,378	238,937	233,927
September 14	700,357	647,485	660,086
September 7	592,786	563,883	577,933
August 31	679,861	647,531	673,778
August 24	626,373	606,917	637,510
August 17	615,006	601,788	643,406
Cumulative Total, 37 Weeks	21,800,003	22,071,870	20,285,628

Car Loading in Canada

Car loadings in Canada for the week ended September 14 totaling 54,341 cars, were 9,621 cars over the previous week's and 777 cars over the total for the corresponding week last year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
September 14, 1935	54,341	19,661
September 7, 1935	44,720	16,632
August 31, 1935	47,380	18,229
September 15, 1934	53,564	19,923
Cumulative Totals for Canada:		
September 14, 1935	1,604,952	781,080
September 15, 1934	1,597,053	810,169
September 16, 1933	1,352,806	674,989

Roadmasters Celebrate Golden Anniversary

Fiftieth convention, held at Chicago, marked by sustained interest on the part of those in attendance

WITH a program embracing 5 committee reports, 11 papers and addresses, and a "Question Box" discussion, the 50th annual convention of the Roadmasters and Maintenance of Way Association, which was held at the Hotel Stevens, Chicago, on September 17, 18 and 19, proved of wide and practical value to the 250 railway officers in attendance. As in past years, the Track Supply Association presented an exhibit of track appliances and materials, with 40 manufacturers participating.

Special recognition was given to the fact that this was the "Golden" convention of this association, which has held meetings every year beginning with 1883, except in 1931, 32 and 33, when activities were suspended at the request of the railroad executives. Tuesday evening was set aside for review of the association's activities and of the part which the association has played in track construction and maintenance during the last 50 years. The story of the organization and growth of the association was presented by George E. Boyd, associate editor of the *Railway Age*; while B. E. Haley, general roadmaster of the Atlantic Coast Line, Lakeland, Fla., pictured track maintenance as it was carried on during the early days of the association's career. In a similar vein R. L. Cairncross, district sales manager, National Lock Washer Co., Chicago, drew on his long experience in both railway and railway supply service, while John V. Neubert, chief engineer maintenance of way of the New York Central System, charged the members with their responsibility to carry on the work of the organization during the years that are ahead.

About 400 members and guests attended the dinner of the Roadmasters' Association and the Track Supply Association on Wednesday evening.

Harry G. Taylor, chairman of the Western Association of Railway Executives, welcomed the members at the opening session of the convention and complimented them on their skill, courage and loyalty in maintaining their tracks to high standards in the face of limited appropriations for upkeep, and in spite of the trying conditions imposed by dust storms in the Southwest, floods in many parts of the country, etc.

Problems of the maintenance officer were reviewed also in an address by S. T. Bledsoe, president of the Atchison, Topeka & Santa Fe, who declared that the present condition of the roadbeds and tracks was surprisingly good, considering the limited funds placed at the disposal of the maintenance of way department during the last four years. In his opinion, however, extraordinary expenditures must soon be authorized to bring the tracks and roadway back to a reasonable level of excellence and still greater expenditures will be necessary to restore them to the standards of pre-depression times.

H. A. Otis, engineer of car equipment, Chicago, North Shore & Milwaukee, presented the results of an investigation of truck nosing conducted under his direction that led to the discovery that this phenomenon could be eliminated by cylindrical tread wheels, as described in his article in the *Railway Age* of September 7, page 301. Mr. Otis' talk was illustrated by motion pictures.

In his address at the opening session of the convention, President Charles W. Baldridge, assistant engineer, Atchison, Topeka & Santa Fe, Chicago, reviewed the circumstances attending the inception and conclusion of the seven major depressions experienced by the people of the United States since the signing of the Declaration of Independence. "In all past depressions," he said, "the cure had been the practice of economy, reduction in government expenditures, a balanced budget, and the re-establishment of sound money. Is there any indication of such an end of the present depression? Again a bit of history may give the proof."

At the closing session of the convention officers were elected for the ensuing year as follows: President, Armstrong Chinn, chief engineer, Alton, Chicago; first vice-president, B. E. Haley, general roadmaster, A.C.L., Lakeland, Fla., second vice-president, W. O. Frame, district engineer maintenance of way, C. B. & Q., Burlington, Ia.; and treasurer, E. E. Crowley, roadmaster, D. & H., Oneonto, N. Y.; T. F. Donahoe, general super-

visor of track, Baltimore & Ohio, Pittsburgh, Pa., was re-elected secretary. R. H. Carter, acting division engineer, I. C., Chicago and A. H. Peterson, roadmaster, C. M. St. P. & P., Chicago, were elected members of the executive committee for four years; while W. C. Pruett, general foreman, M-K-T, Muskogee, Okla., and J. J. Clutz, supervisor of track, Pennsylvania, Trenton, N. J., were elected members of the executive committee to fill vacancies. Chicago was again selected as the place for the next convention.

The following topics were chosen for study and report at the next convention:

1. Preparing and maintaining track for high speed operation.
2. Selecting and training foremen.
3. Inspection of rail—Factors to consider and inspections to make to determine when rail should be relaid, or the measures to be adopted to extend its life.
4. The use of work equipment to secure the greatest economy in track maintenance.
5. Curve Lubricators—Their economy; Considerations affecting their installation.

Following are abstracts of the committee reports and some of the papers presented:

Maintenance and Repair of Frogs; Switches and Crossings

A report prepared by a committee of which Walter Constance, supervisor of reclamation, Chesapeake & Ohio, was chairman, reviewed the developments which have occurred in switch, frog and crossing construction during the last 20 years, and discussed the manner in which better design and improved methods of installation and maintenance have increased the life of these important elements of the track structure.

A considerable part of the report was given over to a review of the steps through which present-day practices of repair and reclamation have been developed. This section of the report also discussed at some length the types of equipment best suited for each class of welding and the methods to be employed in each case.

In electric welding "the tendency is," according to the committee, "to use larger welding units than was formerly the practice, although many roads still prefer the lighter machines because they are easier to handle."

The committee also commented on the practices of various roads, some of which remove frogs from the track and send them to a central shop where they are given a complete overhauling. Others do all of their welding under traffic, regardless of the condition of the frog, which sometimes makes the repairs rather expensive, although they are able to save the cost of removing the frog from the track, replacing it with a new frog and then shipping it to a central point for repair. It stated that "one of the advantages of the latter method is that a frog that has served in the track until it needs repair is usually worn to the same extent as the adjoining rails and is well seated on the ties, thus producing good line, surface and gage. If a new or repaired frog is substituted, some time will be required for it to attain these conditions. Furthermore, a change of frogs causes some damage to the ties from respiking."

After considering all of the factors surrounding this work, the committee concluded that "possibly the best practice is to make repairs in track where only the manganese point and the throat of the frog are worn or fractured and to send all frogs to a shop for repair, that need new parts, or new rivets in the plates."

The conclusions of the committee were that "frogs, crossings and switches should be kept in service by welding in the track wherever it is economical to do so; also that all frogs, crossings, switch points and similar material taken from service should be sent to the shop so that parts may be salvaged for use in the repair of other articles of a similar kind." The report also commented on the fact that this operation would be more efficient than it is if all the materials were standardized, at least on an individual road, so that all parts could be interchangeable.

Organization of Track Forces

Recent developments in the organization of track forces were discussed in a report prepared by a committee of which W. C. Pruett, general foreman, maintenance of way department, Missouri-Kansas-Texas, Muskogee, Okla., was chairman. The subject-matter contained in this report was based on information received from more than 50 railroads in the United States and Canada. The report pointed out that a few lines have been so fortunate as to find it unnecessary to make much reduction in their maintenance allowances and still have about the same organizations as existed prior to 1929, but that a large majority of the roads have been forced by decreased earnings to make drastic reductions. These reductions have been effected mostly by extending the territories of the roadmasters or supervisors and by lengthening sections. The length of main line sections has been increased 25 to 50 per cent, while most branch line sections have been extended as much as 100 per cent.

In discussing changes that have taken place in the basic organization of track forces, the report pointed out that one railroad has established the practice of overhauling its main line tracks completely about every four years. On this road all section forces have been eliminated and extra gangs created in their place, which are of two types: (a) large gangs of 20 to 24 men, with an assistant foreman to handle power machines in the overhauling of tracks; and (b) smaller gangs of 10 to 12 men without an assistant foreman, to take care of the many smaller jobs where large gangs would be wasteful. With the elimination of track walkers, track patrols were created which, in addition to taking care of minor defects formerly repaired by the track walkers, are responsible for the proper inspection of tracks, roadbed and right-of-way on their respective territories. Their territories are such that they can be covered once a day in each direction, alternating on different tracks of a multiple track line.

Another type of organization was described by the report as follows:

> One large railroad of the middle-west has recently reduced the number of sections from 1,702 to 968, which increased the average length of main-line sections from about 8 to 12 miles and on branch lines from an average of 12 miles to 30 miles and in a few cases more. Without reducing the number of laborers, the smaller number of sections permitted the assigning of a larger number of men to each gang. Along with this lengthening of sections, the new position of track supervisor has been created The men appointed to these jobs have the responsibility of patrolling about 75 miles of principal main line, making the patrol one way each working day or three round trips each week. On these patrols they make the same type of inspection that was formerly required of the section foreman. The track supervisor has authority over the section foremen on his territory, being in effect, an assistant roadmaster. By these daily inspections he is in a position to direct the foremen where to work; also he relieves the foremen of their daily inspections, with the resulting loss of time to their section gangs. It is reported that this reorganization has markedly increased the amount of work done by each gang.

A majority of the railroad officers from whom the

committee received information expressed a desire to retain the old organization of section gangs supervised by section foremen, the consensus being that best results are obtained by a smaller all-year section gang under a foreman with continued interest in and responsibility for the maintenance of a definitely assigned territory. The report suggested that section limits may be extended considerably, as compared with the short sections that were the practice prior to 1929, but in no case should the sections be of such length as to make the patrolling of the track or the going to and from work too expensive. It recommended that section limits should be proportioned throughout each division on an equated mileage basis. The report suggested that a section of 12 to 15 equated miles is sufficiently long and that in order to obtain the greatest efficiency from small section gangs they should consist of a foreman and an odd number of men, say 3 or 5, so that the foreman will have a man for a partner, and will be a "working" foreman.

In order to maintain the proper standard of maintenance, the report recommended that, in addition to the small section gangs, at least one extra gang should be provided for each roadmaster's sub-division and that each extra gang should be furnished with power machines manned by men especially trained for handling them and should be in charge of the best available foreman, with an assistant foreman if needed.

The opinion was expressed that no single factor has a greater influence upon efficiency in maintenance of way work than that of programming it in such a manner that it can be carried on systematically. Extra gangs may be increased or decreased in accordance with the demands of the working season, but the work planned on each section's program should be so arranged as to employ as nearly uniform section forces as possible the year round. Steady employment, said the report, attracts a better class of labor, and will result in more efficiency.

Other subjects discussed in the report included the need for more efficient inspection of railway track and structures by specially trained and qualified men; the feasibility of providing a differential in the rate of pay for trackmen in accordance with their experience and efficiency; and the recommendation that more consideration be given to the education of foremen and trackmen.

Discussion

Comments from the floor on this report disclosed a rather widespread objection to the employment of inspector-supervisors as a means of relieving section foremen of patrol duty, both on the ground that inspection made by one man on a motor car would be less thorough and that the morale of the foreman would suffer if his work were planned for him daily. However, members who had had experience with this plan of organization spoke favorably of it, but cautioned against excessively long territories for the inspector-supervisors.

Maintaining Tracks in Terminals

Present-day practices of maintaining tracks in terminals were reviewed in a comprehensive manner in a report prepared by a committee of which A. H. Peterson, roadmaster on the Chicago, Milwaukee, St. Paul & Pacific, at Chicago, was chairman. The number of terminal gangs, the report said, has gradually decreased on most railroads since 1924. On railroads where the foremen's territories have been increased to include 50 miles or more of track and 200 to 300 switches, an assistant foreman has been provided to handle certain phases of the work. Each of the gangs, the report said, is provided with a track walker who patrols leads and other yard tracks and does light repair work single handed. Other men in the gang are assigned permanently to such tasks as attending switch lamps, icing or cleaning cars, janitor work, etc. By delegating such duties to certain assigned men who will follow a regular routine, the committee feels that fewer men will be required.

In the larger aspect of terminal track organization it is found that each terminal gang usually maintains main line as well as yard tracks. The majority of this committee is of the opinion, however, that a separate main-track gang is desirable, for this will permit the yard foremen to confine their attention to yard tracks and leads while the main line receives the undivided attention of a separate gang.

In describing the advantages of large terminal gangs, the report pointed out that the cost of terminal maintenance is now the lowest in history, while the derailments are the fewest. With a smaller number of gangs, it said, less material need be carried in stock and the properties are being maintained today with a minimum of overhead expense. Moreover, each gang is capable of handling its own material without doubling up.

A considerable portion of the report was devoted to a discussion of the practice of using extra gangs to make heavy tie renewals and for renewing rail out-of-face so that the regular section gangs will be free to carry on their routine duties. In giving the advantages of such a system, the report stated that a floating gang is able to work without interruption and therefore can release track more quickly; it is able to do such work at a lower cost; and is in a position to utilize power machinery of various kinds to good advantage. The committee feels that a gang of 50 to 75 men is most satisfactory in the yard while a gang of 20 to 30 men may be more suitable on leads. Where only a single floating gang is available, it is the opinion of the committee that it should do all classes of work, while if there are two gangs, one can do the rail work and the other ballasting and tie renewals. It was also the consensus of the committee that where the climate permits, a floating gang has a place in terminal maintenance the year round, as it is felt that year-round stabilization of the gang will attract the best class of labor and will result in both better and greater production per man.

While admitting that section gangs, as a rule, do better work than floating gangs, the committee felt that the work is done at a higher cost and with more interruption to traffic than if the same work is done by extra gangs. It was pointed out, however, that the quality of the work done by floating gangs is the responsibility of the roadmaster and he may set the standard as high as he wishes.

In a discussion of the feasibility of programming terminal maintenance work, the committee felt that while short-notice jobs will occupy the time of six to eight men in gangs whose territory averages 50 miles of tracks and 300 switches, the work performed by any number of men in excess of these may be programmed successfully. The practice of one road in programming its terminal work was described.

Figures submitted to the committee by more than 50 representative roads in the United States and Canada indicate that the cost of maintenance in the larger terminals was 70 per cent less in 1934 than in 1924. Without exception, every road reporting stated that its terminals are being maintained more cheaply than at any time in the past.

It is the opinion of this committee that standardiza-

tion of track materials, especially rail, would simplify terminal track maintenance greatly, for today it is not uncommon to find 20 sections of rail in a single large terminal, with 10 to 12 different frog angles, 6 to 8 different kinds of joint bars for the same section of rail and every conceivable kind of tie plate and rail anchor. While not in favor of rigid standardization, the committee felt that some means must be found to eliminate the present tremendous waste through minor variations of no essential value.

Discussion

Comments on this report disclosed the tendency of supervisory officers to oppose changes in organization —in this case, the committee's expressed approval of the trend toward fewer and larger gangs in terminals, but several speakers who had had experience with larger gangs spoke enthusiastically of the advantage and economy of larger units. Attention was directed also to the necessity for closer co-operation between the track forces and the transportation organization in yards for the purpose of scheduling the release of tracks for the conduct of track work with a minimum loss of time.

Handling and Distribution of Ties

In a report prepared by a committee of which E. L. Banion, roadmaster on the Atchison, Topeka & Santa Fe at Independence, Kan., was chairman, the problem of the handling and distribution of ties from the treating plant or storage yard to the point of use was discussed in a comprehensive manner. After pointing out that the life of ties has been extended from 6 or 7 years untreated, to 20 or more years treated, the report undertook a brief discussion of the various factors that have brought about a large reduction in tie renewals during the last 10 years.

The report then discussed the various ways in which ties are damaged after they leave the treating plant or storage yard, pointing out that many ties are damaged in unloading and distribution by being dropped on old rails along the track, thrown down fills, or by being unloaded in rock cuts or other locations where they are split, bruised or splintered. The report advocated that, generally speaking, shipments should be made from the treating plant to the point of use during the fall and winter months, in order that renewals may be started as soon as possible after the frost is out of the ground.

With respect to tie distribution, the report said that the proper manner of distributing ties will always involve a difference of opinion among the various railroads and will be governed by the same conditions that determine the proper season for shipping ties. Maintenance men on 33 railroads were then asked the question: "How are your ties distributed when received from the treating plant or storage yard? Piled at stations? Unloaded by local or work train at the actual point of use?" Six of these officers favor the practice of unloading ties at stations and trucking them to the point of use on motor trailers, 17 prefer to use a work train or local freight to unload them at the actual point of use, 4 favor using the method best suited to local conditions, while 6 favor placing the ties at the actual point of use, but did not indicate the method to be used.

The report pointed out that there are good reasons for unloading ties at the point of use between stations, particularly in the sparsely populated districts of the West, but that in the heavily populated industrial districts where stations or tracks are only a few miles apart and where space is not available for storing ties on the right of way, it would be more practical to unload the ties at the stations and truck them out to the point of use as needed. In a discussion of the question as to what type of equipment is best adaptable to the loading of ties, the report said:

> It is commonly agreed that there are few, if any, cars better suited for the shipment of ties than low-side open-top cars. Cars ordinarily used in the coal trade, except gondola and hopper bottom cars with extremely high sides, are well suited for this purpose. Mill-type cars with sides four to five feet high are also well adapted for tie loading but are seldom available. The cost of loading 400 ties in a closed car at the treating plant by hand approximates $6, while the same number of ties can be loaded in an open-top car with a crane for $2.50. If open-top cars are staked and wired to increase the capacity, the cost will be increased $1 to $1.50 per car.

Other considerations, the report said, also have a bearing on this problem. For instance, a certain type of car may not be available for use in hauling ties because of a demand for its use in commercial service. Furthermore, the use of certain types of cars, such as "battle ship" type or extremely high-side coal cars or gondolas, as well as hopper-bottom cars, for loading ties should be prohibited because of the hazard of personal injury that is involved in unloading them.

In regard to the manner of loading ties, the committee made the following recommendations:

> As a general practice it is our recommendation that all ties be placed lengthwise in cars except those loaded in closed cars, in which case two tiers of ties should be placed lengthwise at each end of the car, with those in the door space placed cross-wise to facilitate breaking the load. The height of the load should not be in excess of six feet above the car floor.

It is not necessary, said the report, to season ties treated with creosote and oil after treatment, but it is the consensus of the committee that ties so treated should not be used for 60 days after treatment, if for no other reason than to allow them to dry, for this will facilitate handling and will eliminate many of the creosote burns suffered by men handling freshly treated ties direct from the retorts to the point of use. Ties treated with zinc chloride or other water-soluble salts should be seasoned for at least 60 days in an open pile before being inserted in the track.

The report had the following suggestions to make concerning the piling of ties:

> The proper method of piling ties depends on the treatment, the climate and the amount of seasoning necessary. Creosote and oil-treated ties usually require close piling and should not be exposed to the direct rays of the sun. The covering of the top layer of ties with an inch of sand, dirt or cinders will afford the necessary protection. Ties treated with zinc chloride and other salts usually require additional seasoning, and should be stored in open piles with minimum contact and with the outside ties in each tier turned on edge to allow the air to circulate freely through the pile.

Discussion

The discussion of this report revolved largely around the question of the proper time to ship ties from the plant, two opposing thoughts being advanced. Some of the roadmasters favored shipments immediately prior to the time of use so that the ties could be distributed directly from trains at the point of use. Others favored advance shipments in order to assure a plentiful supply of ties when the tie renewal season arrived. The practices on a number of roads were described, some of which ship according to a definite schedule, while others make shipments to suit the convenience of the treating plant. Attention was called to the fact that the storage facilities at treating plants are seldom sufficient to accommodate a full year's allotment of ties and, therefore, some ties must be shipped well in advance of use. Furthermore, ties must be treated, in general, as soon as seasoned, and this often dictates the practice with reference to

shipments. There was also some discussion of the difficulties encountered in attempting to distribute ties from local freight trains—the maintenance forces too often being compelled to lose valuable time waiting for trains that do not arrive according to the pre-arranged schedule.

Ballasting and Resurfacing Track

A comprehensive report by a committee, of which J. J. Clutz, supervisor, Pennsylvania, was chairman, dealt with the factors which make general surfacing or the renewal of the ballast necessary; the organization and equipment needed; and the methods to be followed. In making its study, the committee found that so many variables enter into the problem as to make it impossible to develop formulas or rules to govern a determination as to when track should be resurfaced or reballasted. For this reason it presented only some of the more important principles which have been developed by experience and under varying conditions.

Among the factors which must be considered are rail condition; kind, condition and depth of ballast; tie renewals; speed, character and wheel loading of traffic; drainage and subsoil conditions; general condition of the track; and maintenance of way appropriations.

It was the committee's opinion that new rail should be surfaced out-of-face immediately after it is laid, including a general raise, tie renewal and surfacing. This is necessary to prevent the rail from becoming line and surface bent. Experience has shown that the heavier sections of rail, with their relatively high web, do not become surface bent so easily as the lighter and lower sections, but that when bent it is practically impossible to overcome the kinks by surfacing as could be done with the more flexible, lighter section.

In commenting on general surfacing in connection with tie renewals, the committee stated that:

> If tie renewals are heavy, the track should be resurfaced in connection with this work. Tie renewals are made much more economically if the track is given a lift. If a tie is dug in, the old tie is usually worn so thin by reason of plate cutting that it is necessary to destroy the bed in order to install a new and thicker tie. This creates a track which will be rough until a new bed is formed. On the other hand, if the track is first raised, the old bed is not disturbed and a new and uniform bearing is obtained under all ties, both old and new, creating a resilient track.
>
> While there is no definite rule as to how heavy tie renewals must be to warrant resurfacing in connection therewith, 4 ties per 39-ft. rail is a commonly accepted minimum in stone and gravel ballast. With the widespread use of treated ties, annual tie renewals have been greatly reduced, frequently averaging one or less per rail length. In such cases, tie renewals of themselves do not justify resurfacing.

Taking cognizance of the present trend in speeds for both passenger and freight trains, the committee stated that:

> Where speeds or wheel loadings are high, track which once begun to break down in surface can be restored only by a general resurfacing. The increasing speed of both passenger and freight trains demands smoother, resilient track that is possible only through frequent resurfacing. Track which has become center bound can be restored to good riding condition only by resurfacing.

In the section of the report devoted to organization, methods and equipment, it was stated that these are all somewhat interdependent and are controlled by the kind of ballast, the height of lifts and other work that is being done in connection with the resurfacing. It was recommended that, in general, the height of the raise should be only enough to permit the placing of fresh ballast under the ties, instead of making a raise high enough to bury the dirty ballast, except where the original depth of the ballast is insufficient to insure a uniform distribution of the load over the subgrade. "It is certain," said the committee, "that the higher the track is raised, the more and the longer it will settle as the new ballast compacts under the ties, and more surfacing will be necessary to preserve smooth, tight track."

Three special conditions, according to the report, most commonly encountered justify high raises, these being:

> (1) Changes in grade made necessary by some condition other than track maintenance proper, but these do not come within the scope of the report.
>
> (2) Insufficient depth of ballast under the tie to distribute the load over the subgrade uniformly. This depth should be not less than the spacing center to center of the ties.
>
> (3) Changing the type of ballast in track. In making this change the track can be given a heavy lift on the new ballast or it can be skeletonized and given a light lift. In either case, care should be exercised to get several inches of the new ballast under the ties, both to insure the desired benefit from it and to make it possible for the section gangs to work the track economically and efficiently. Since different tools will probably be required for each type of ballast, a mixture of two kinds can never be surfaced satisfactorily.

The report dealt at length and in considerable detail with the method of resurfacing and the equipment to be used in various kinds of ballast, including cinders, gravel and stone, and with the desirability of cleaning stone ballast at intervals. Some of the newer developments in tie-tamping equipment were also discussed.

Conclusions

The committee reached the following conclusions:

> (1) Many factors enter into the question as to when to raise track, which can be decided only by the man on the ground, after taking all of these factors into account.
>
> (2) Foul ballast should be cleaned or disposed of before raising track.
>
> (3) Worn joint bars, battered rail ends and burned rails should be corrected before resurfacing.
>
> (4) Where tie renewals reach four or more to the rail, surfacing out of face should be considered.
>
> (5) Unless special conditions dictate otherwise, the raise should not exceed three inches and preferably not more than two inches.
>
> (6) Stone-ballasted track should be tamped mechanically in resurfacing.
>
> (7) The resurfaced track should be back-surfaced after a month to correct any loose ties which have developed.

Discussion

Considerable of the discussion of this report related to a recommendation that the ties be spaced closer at the joints, several speakers objecting to this, as their roads no longer space ties at the joints. The answer of the chairman was that the joint ties should be placed closer together, regardless of whether the joints were "suspended" or "supported." These comments led to a discussion of slot spiking, which showed that about as many opposed this practice as favored it.

The Place of the Railroads in Transportation

By G. S. Fanning*

Recent years have brought new inventions of seeming basic importance in the fields of electricity and the internal combustion engine. New facilities for transport, the automobile, bus and truck, and air-craft have caught the public fancy, and the agitation for more inland waterways has become more persistent. These agencies seem to challenge the supremacy of the railroads for inland transport. Can they take the place of the railroads? We can best answer that question by asking another. What do

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passengers and shippers require of transportation agencies? They require adequate service at low cost. Adequate service includes (1) safety, (2) reliability, (3) speed, (4) convenience, (5) comfort (for passenger service). Each of these elements of service has its effect upon cost.

Let us look at our competitors in the light of these requirements.

First, our oldest rival, the inland waterway, ruined 100 years ago by the railroads, still plagues us. We are quite romantic about the sea and ships and even about Mud creek and an old flat-bottomed canal boat, and when we grow romantic we lose some of our natural level-headedness and overlook the cost. For more than a hundred years the federal government has been improving the rivers and harbors for navigation. Many of these projects, such as the improvement of our great ocean ports and channel improvements on the Great Lakes and major rivers, have been of tremendous importance in increasing our national commerce and wealth. But with the project for which there is no true economic justification, the project for which a "potential" traffic is claimed, by counting all the traffic already moving by existing adequate transportation agencies—with such projects we are beginning to quarrel.

What do we find as to the service offered by inland waterways? As to safety we offer no argument, although coast-wise traffic is subject to such perils of the sea as the hurricanes off Florida, which form one excuse for an economically unsound canal across the peninsula. As to reliability, we challenge the adequacy of any service which must be suspended during the fall, winter and spring months because of fog, ice and flood. As to speed, American agriculture and industry generally have reached a point in their development where four miles per hour, the normal rate of traffic on inland canals, is no longer acceptable in their economic set-up. As to convenience, waterways at their best can reach but few agricultural and industrial areas directly. They must be reached by most users through other supplemental transportation agencies. Furthermore, but few waterways have established common carrier lines. Their principal benefit has been to certain private interests that can afford to own their own vessels and operate them toll-free on the waterways which the romantic taxpayers have so generously provided. As to costs, as long as the waterways are free, their transportation costs will appear to be low and water carriers will continue to make their rates a differential, usually 80 per cent.

Inland waterways may continue for a while to chisel traffic from the railroads and make it necessary for the remaining traffic to pay a higher rate, but fundamentally they give no promise of being able to supplant the railroads, even in territory where they now exist.

What about the service offered by our competitors on the highways? As to safety, the front pages of our daily papers record the death and destruction which these irresponsible unregulated operations cause throughout the land. Their reliability depends almost entirely on the responsibility of the operators, being entirely lacking with many. In addition, snow and ice seriously slow up or interrupt their operations, except on main trunk roads where public authorities keep the roads open with the taxpayers money.

As to speed, with the present density of traffic on the highways, it is generally satisfactory, but this condition can not continue with any substantial increase in density without the construction of additional hard surface roads. To provide enough highways to take care of all or any major part of the traffic now moving on the rails is an obvious impossibility in the face of the tax burden already awaiting the coming generation.

Convenience is the principal element of service the trucks and buses have had to offer. They come directly to the shipper's door for a shipment and deliver it directly at the receiver's door. This service is now being met by the railroads in their door-to-door delivery.

The comfort of passengers in buses is notoriously much less than in modern air-conditioned railroad coaches. Costs to the shipper by truck or passenger by bus have generally been less than by rail. As long as they have a virtual subsidy in the use of public constructed and maintained highways, their lower operating costs will continue. The carriers have hitherto enjoyed immunity from government regulation as to service; accounts, records and reports; safety of operation and equipment; and rates, fares and charges; with the result that their operating costs have been reduced at the expense of safety and their charges have been determined not by the cost, but to undercut the rail rate. These unfair advantages arising from the lack of regulation will, it is hoped, be corrected by the Motor Carrier Act of 1935 which places the regulation of common and contract motor carriers under the jurisdiction of the Interstate Commerce Commission.

Our newest competitor is transport by air. The younger generation is unquestionably air-minded. But stripped of romance and thrill, what has air transport to offer?

As to safety, less than nothing. It is said that when a man flies he takes 66 times the risk he incurs when on the ground. Most engineering structures, including railroads, are built with a factor of safety of from four to six; that is, they have four to six times the strength required to withstand the strains to which it is known they will be subjected. This safety factor takes care of the most extraordinary occasions which might, but are not likely to, arise. Obviously this method of design adds weight to any structure or vehicle. With such added weight, air craft of the heavier than air type would be unable to rise from the ground, so the factor of safety is greatly reduced and when the extraordinary situation arises the plane that is caught in the air cracks up. To avoid this, planes are kept out of the air when these extraordinary occasions are likely to arise and that makes them about as reliable as the weather. In speed, they exceed anything which the railroads can ever hope to attain. Some of the time saved in flight is lost due to the usually remote locations of landing fields. Their costs to the passenger are no more favorable than on the railroads, in spite of the subsidies which they enjoy in the form of public landing fields and mail contracts.

What have the rails to offer their customers? Safety greater than that of their own homes; reliability almost clock-like the year round, summer and winter, day or night, fair weather or foul; reasonable speed, increasing convenience and comfort, at costs commensurate with the service offered. We are still far from perfect; time lost in handling traffic at terminals and through yards must be reduced, schedules made as frequent and convenient as practicable, costs reduced wherever possible—and what we have learned about that in these years of distress! With all our failings, we are still the backbone of the nation's transportation system. We can co-ordinate these other agencies as the useful supplements that they should be and the rails can be the "tops"—if we have faith and tell the world.

Track Maintenance of Today

By C. J. Geyer*

The roadmaster, through his intimate contact with track foremen and laborers, consciously or unconsciously exercises a tremendous influence for high or low standards over this large class of employees. Regardless of how bad other conditions may be, a high morale, a fixed standard, an ultimate goal, will carry any department a long way toward the desired end. Conversely, an unhappy, low-spirited body of men will wreck a maintenance department, even though liberal allowances of men and materials are available.

Our track work today is done in accordance with a program and fixed standards. Every modern railroad has standard plans for practically every unit of material going into the track structure. These plans are in the hands of the roadmasters and foremen, who are charged with their practical application, but many of us are not trained in reading plans and building by them, and we often have pet ideas differing from the plan adopted. Thus, one of our problems is to get uniform work in accordance with the standard plan adopted by the management. In order to accomplish this, some roads have adopted the method of putting up a mile of model track on each roadmaster's territory. This mile of track is the goal to which every trackman on the subdivision should work. In recent years the motion picture is used to educate trackmen in methods of doing work, handling equipment and the appearance of the completed structure. Strict adherence to our standards may develop some improvement that can be made which is not found when we permit variations.

It is the practice on modern railroads to have an annual maintenance budget and a fixed work program. A detailed inspection is made of the roadbed, ballast, ties and rail, but I sometimes doubt if we attach enough importance to this phase of our job. We must plan for a uniformity of maintenance in keeping with the requirements on the railroad as a whole, so that each division of the same class will be maintained at the same level.

The annual budget is prepared from the notes of this inspection, showing by items the amount to be spent and the programmed expenditure for each month of the year. Such a program will enable a roadmaster to check his progress very quickly and also determine the efficiency of each gang. It also permits the orderly purchase and distribution of materials so there will be no lost motion in changing from one job to another.

I am afraid that we often lose sight of the economies that can be effected by this program and budget plan, as compared with month-to-month allowances that vary with fluctuations of business. A little thought on what happens when forces are suddenly cut or expanded will give you some idea of the total

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cost. To illustrate—a roadmaster has a gang of 30 men working on a job of two or three months' duration. Material for the job is distributed. He gets orders to cut off this force. It is necessary for the roadmaster to leave his routine work and make arrangements to disband the force, close up the camp cars and ship the tools to headquarters. All of this requires some labor expense. The material for the job is left along the right-of-way, representing dead money. Later the roadmaster receives authority to re-establish this force and the above operation is reversed, except that he finds some windows broken out of the camp cars and probably other deterioration, and a great many new faces in the gang. There are several days of low production, with consequent loss. Multiply this loss by all the gangs on the railroads and repeat it two or three times each year, and one can see that at least 10 per cent (probably it is nearer 25 per cent) of the expenditure is wasted.

Another feature of present day maintenance somewhat related to the program and budget is the kind of material or machinery or the type of structure that will be used. In the last analysis, there are just two factors to consider in deciding the type of unit to use: (1) Will it serve the purpose? (2) Will its annual cost be less than that of another type? One may decide the first by observation, by test, or by some other means. To decide the second, he must have a pretty good idea of the life that may be expected from the unit in question. If one has to get more than 30 years' life out of a certain unit to make its annual cost equal that of some other less expensive type, it is doubtful if it pays to buy the higher priced article.

The modern railroad is keeping a close check on its maintenance costs. I do not mean the costs as reflected by charges to the I.C.C. accounts, but the actual cost of each class of work done by each gang. This is not an expensive operation because of the reports required for accounting purposes. It simply means one additional man on each division or subdivision to find the unit cost from the foreman's time sheets and material reports. This man usually acts also in the capacity of an assistant roadmaster. Incidentally, this is good training for future maintenance officers. The operation of this system is simply the allocation of each gang's total time to specific jobs, as reflected in the foreman's distribution of time. There is no chance to fake the result, because failure to charge time properly on one operation will simply raise or lower the cost on some other operation and the error is readily detected. The advantage of this method lies in the increased efficiency in the performance of all maintenance jobs and the resulting lower costs. This is brought about by a detailed time study of those gangs having low costs for any particular operation. This study generally shows that the foremen in charge have methods somewhat different from those generally accepted, and this knowledge is passed to all foremen doing that class of work.

Fuel Association Holds Two-Day Meeting at Chicago

Emphasis placed on further reduction in fuel costs—Program includes ten constructive committee reports

THE possibility of still further reductions in fuel costs was stressed in a two-day annual meeting of the International Railway Fuel Association held at the Hotel Sherman, Chicago, September 18 and 19. The meeting, with a total registration of 125, was presided over by President J. M. Nicholson, division master mechanic, Atchison, Topeka & Santa Fe. Ten committee reports were presented covering many important problems in connection with the purchase, inspection, distribution, and use of railway fuel. Two special speakers on the program included Silas Zwight, general mechanical superintendent, Northern Pacific, and J. D. Battle, executive secretary, National Coal Association. The committee reports, some of which are abstracted in the following pages, covered: "New Locomotive Fuel Economy Devices," "Stationary Boilers," "Fuel Bulletins and Cartoons," "Steam Turbine and Steam Condensing Locomotives," "Locomotive Firing Practice," "Inspection and Preparation of Coal," "Storage of Coal," "Fuel Stations," "Fuel Distribution and Statistics" and "Fuel Records vs. Fuel Costs."

Election of Officers

At the conclusion of the business session, the following officers were elected for the ensuing year: President, C. I. Evans, chief fuel supervisor, M-K-T.; vice presidents, J. D. Clark, fuel supervisor, C. & O., J. G., Crawford, fuel engineer, C. B. & Q., and J. R. Jackson, engineer of tests, M. P.; secretary, T. Duff Smith; executive committee, M. F. Brown, fuel supervisor, N. P.; L. E. Dix, fuel supervisor, T. & P.; G. H. Likert, fuel engineer, U. P.; C. N. Page, fuel supervisor, L. V.; A. A. Raymond, superintendent of fuel and locomotive performance, N. Y. C.; W. C. Shove, fuel supervisor, N. Y. N. H. & H.; W. R. Sugg, superintendent of fuel conservation, M. P., and R. S. Twogood, assistant engineer, S. P.

Report on Cost of Unloading Coal

During the past year the Committee on Fuel Stations has made an investigation of the relation of coal-car door arrangement to the cost of unloading coal, and finds that the principal items of this cost are: Opening and closing the car doors; removing coal from cars; cracking and passing through breaker bars; setting and spotting cars; operation of hoist, if any; cleaning up around pits and below outlets; supervision; maintenance; supplies and miscellaneous.

As a result of tests, the following six conclusions have been drawn:

(1) Heavy loading of coal cars decreases the cost per ton, as the time of opening and closing doors costs the same regardless of net weight.

(2) Likewise the least practicable number of doors is desirable in order that the time of opening and closing doors may be a minimum, as well as the time of shoveling.

(3) Use no more men than necessary to keep from running out of coal, for two men can unload more tons per man-hour than four men.

(4) Use Plan No. 7 (16 door cars) and hopper cars for company coal to the fullest extent possible and save from $.01 to $.02 per ton in handling costs. Continue to keep Plan No. 1 (four door cars) out of company coal service.

(5) The crushed six-in. lump used on these tests needed no preparation and in unloading this and similar hand fired coals over one-half cent per ton could be saved by removing the breaker bars during the unloading. This due to the fact that, although individual pieces of coal could be passed through the breaker bars without cracking, these pieces pyramid on the

breaker bars. These bars, however, are necessary to protect the machinery from foreign material in the coal.

(6) Pits 8 ft. longer would permit any car to be unloaded at one spotting, which would save time.

It is recommended that each railroad—especially those using flat-bottom drop-bottom cars—make the necessary investigation to determine whether or not the unloading cost of company coal can be reduced by increasing the tonnage handled in some types of cars and reducing the tonnage handled in other types.

The report was signed by Chairman J. G. Crawford, fuel engineer, Chicago, Burlington & Quincy.

Fuel Records vs. Fuel Costs

The present yard stick used to measure fuel performance is more or less misleading, as it expresses results in pounds per thousand gross ton miles instead of dollars. While at first glance it might appear that the two terms—pounds or dollars—are practically synonymous, however this holds good only where the fuel used is all of the same general characteristics. It is not truly representative of the results that might be obtained were consideration given to a possible reduction in costs through the use of a different fuel than that established as standard.

As the majority of railroads use coal as locomotive fuel, the principal part of this discussion will deal with that element.

In order to obtain the perspective on which our present yard stick is based, it seems well to go back a few years and trace the gradual evolution of fuel data to its present terms.

In the early days when the railroads began to bid for traffic, the first requirement was to determine the cost of the service in order to establish a reasonable rate. In this cost, fuel then as now was one of the major items. No unit of measure was established by the operating department, however, even though this cost was then, as at present, charged as an operating expense; the total fuel cost was included in the total cost of conducting transportation and distributed pro rata.

In the course of time the mechanical department, in order to obtain comparative data as between various types of locomotives, began to keep records, using as a base locomotive miles per ton of coal, per pint of lubricating oil, cost of repairs, etc.

Naturally the first data were of doubtful value owing to the difference in service in which the locomotives were engaged. However, this was a step in the right direction, and as it was assumed that any reduction in fuel consumption was largely a matter of locomotive design, the whole proposition was left in the lap of the mechanical department.

This department cheerfully assumed the responsibility and through their efforts the highly efficient locomotive of today was developed. During the same period, however, realizing that miles per ton of coal was not the proper yard stick on which to base fuel performance, the new unit of measurement—pounds of coal per thousand gross ton miles, and pounds of coal per passenger-train car mile, was adopted.

This yard stick, while it serves its purpose insofar as the mechanical department is concerned, does not include the most important factors entering the equation, viz., time and price.

Inasmuch as the cost of fuel is an operating charge, it would appear that the next step would be to place the selection of fuel under the operating department and change the present yard stick from pounds of coal per unit of work to cost of coal per 1,000 gross ton-miles per hour and passenger car-miles per hour.

On the present basis, particularly where the fuel supervisor reports to the mechanical department, it is but natural that a grade of fuel is selected or specified that will show the best statistical performance, that is, pounds per thousand gross ton miles, etc. However, if pounds is forgotten and dollars only considered, it might be found possible to use a lower priced fuel with a resultant decrease in cost per thousand gross ton-miles even though the consumption on the pound basis increased.

For instance, in certain sections of this country the method of mining the coal results in such a high percentage of slack that the railroads will not accept it as mined. This means that the operator must screen out the excess, resulting at times in an accumulation of screenings for which there is no ready market except at a reduced price.

With locomotives adapted to burn slack economically, i. e., equipped with proper grates, brick arch and mechanical firing apparatus, there is but little difference in the amount of coal burned per 1,000 g.t.m. as between mine run and screenings, therefore it appears logical that, if the railroads would take the coal as mined (of course, properly cleaned), both the operator and the railroad would benefit.

Again, the character of the coal mined in different sections of this country shows a wide variation in proximate analysis, B.t.u. value, etc., therefore it is but natural that the fuel supervisor in order to make a good pound showing should reach into other fields should the territory served by the railroad on which he is employed produce a coal that will not give the same pound results. However, if there is not enough difference in the evaporative quality to offset the difference in price plus freight charges, such a departure not only results in a loss to the railroad, but also is neglectful of one who may be a good customer-shipper.

[The report here cited a specific instance on the Denver & Salt Lake in which an increase of 10 per cent in fuel consumption per 1,000 gross ton-miles was accompanied by a final decrease in cost of 36 per cent. The excellent results in reducing total costs by the use of relatively cheaper fuel such as screenings on the Chicago & Eastern Illinois, the Bingham & Garfield and the Denver & Rio Grande Western were also cited in the report.—Editor.]

From the above, it is clear that, even though there is no pound increase, the cost of fuel per unit of work has already increased, with a possible further increase should the Guffey Bill be sustained. Therefore, to reconcile the increasing cost regardless of any decrease in pound consumption per unit of work, it seems advisable to change our yard stick so as to show both pounds and cost, as is now being done by some Eastern roads, instead of sticking to the old measure which shows pounds only. Dollars are more impressive than pounds.

New Locomotive Fuel Economy Devices

A review of the year's developments indicates a decided trend towards a reduction in the dead weights in new designs of rolling equipment and reduced train loads and higher scheduled speeds in both freight and passenger service. Reduction in train loads and increases in train speeds are not conducive of fuel economy as compared with the fuel performances of the days of heavier train loads moved at more moderate speeds and, if fuel economy is to be realized in the future, with the apparently changing picture, it is going to be necessary to take full advantage of improvements and refinements in the design of the steam locomotive and auxiliaries.

The supremacy of the steam locomotive in the passenger field is being challenged by the Diesel-electric train units now being experimented with on a number of roads. As regards ability to maintain the faster schedules, the steam locomotive has, so far, met the challenge, but the economics of the question as between steam and the Diesel-electric powered trains has yet to be reduced to a cost basis through tests on a strictly comparable basis; the relative fuel consumptions and net fuel costs of the distillate burned in the internal combustion engines as compared with coal or oil burned to generate steam in the steam locomotive being but one of the factors involved.

During the past year we have heard much about streamlining of railroad rolling equipment as a means of reducing train resistance and hence contributing towards fuel economy. The idea has hit the popular fancy and has had a distinct advertising value to the railroads, but, in the light of the best available information before your committee, we can see no promise of any appreciable fuel economy to be derived from streamlining as applying to railroad equipment operating at the speeds possible with the present average track structures.

Your committee has very little to report this year regarding progress in the development of fuel saving auxiliary apparatus or devices to be applied to the steam locomotive. This part of the report is covered by the following summary of items listed in previous annual reports or called to the attention of the committee during the past year:

Feed Water Heaters.—Now considered as standard equipment and applied to new locomotives as built and to existing power as circumstances permit and the necessary money is available. A new development, applicable to any pump-type heater, is a device for preventing the entrance of cold water into the boiler when no exhaust steam is available. This is a live steam heater which is interposed between the pump and the boiler. It is reported that this device will raise the temperature of ordinary tender water to around 150 deg. F. before entering the boiler and boosts the temperatures of hot water around 50 deg. F.

Superheaters.—Standard equipment on all new locomotives built. Nothing new to report covering new designs mentioned in 1934 report.

Roller Bearings.—No absolutely comparable data available

covering value as fuel economy device as applying to locomotive driving axles, rods and other machinery parts.

Water Conditioning.—The practice of conditioning locomotive boilers by terminal and on-line blowing in place of frequent terminal water changes and boiler washings is becoming more general as an economy measure. The "Foam-meter," having been proven as a reliable device for automatically controlling foaming of boiler waters, is being experimented with extensively, on a number of roads where long runs are made through territories where foaming waters exist.

Water Level Indicators.—Several devices have been on the market which indicate in the cab the level of the water in the tender tank, thus eliminating the necessity of engine men climbing back over the tender to measure water. A new device of this class has been developed and placed on the market this past year by one of the manufacturers of gages.

Ash-Pan Dampers.—Several roads report a saving in fuel and reduction in fire-box maintenance costs by the use of ash-pan dampers. These dampers, which may be automatically controlled or manually operated, function partially to blank off the air openings between the ash-pan flare and the mud ring around terminals and when the locomotive is drifting.

Your committee recommends strongly that the question of fuel economy be carefully considered from all angles with each design of new steam locomotive to be built in the future, with particular reference to the proper proportioning and relationships of boiler and machinery parts and details to make it possible for the men charged with the operation of the locomotive, when placed in service, to realize the full possibilities of the fuel or fuels available.

The report was signed by Chairman J. R. Jackson, engineer of tests, Missouri Pacific.

Steam Turbine and Condensing Locomotive

This committee, in the interest of fuel economy, and beginning with its first report in 1928, has endeavored to do two things:

First, to obtain as much information as possible regarding steam turbine and condensing locomotives in this country or foreign countries, and report, as a matter of progressive record, to this association.

Second, in order to promote as much interest as possible in this subject, to outline and submit a proposed design for a steam turbine and condensing locomotive.

Referring to the first subject, this committee has, with its reports to this association each year, recorded a considerable bibliography of the progress made in this subject in foreign countries. Steam-turbine driven or condensing locomotives have not been used in this country.

During the last few years, on account of economic conditions, there has been very little progress made in the development or building of steam-turbine driven or condensing locomotives in foreign countries, except for the one steam-turbine driven non-condensing locomotive which has recently been built at the Crewe Works in England for the London, Midland & Scottish. This locomotive is of the same type and general construction as several now in service, except that steam turbines and a geared drive have been substituted for the conventional four-cylinder reciprocating engines and driving gear.

[The report here included a general description of the L. M. S. locomotive followed by a discussion of the advantages of steam turbines over uniflow engines and also included a discussion of the proposed steam-turbine condensing gear-drive locomotive which is designed to meet operating conditions on American railroads. The report closed with the following comparison of this locomotive with the present conventional steam locomotive and with Diesel-electric locomotives.—Editor.]

Before closing this report, a brief general comparison should be made of the present standard type locomotive with the proposed steam-turbine condensing locomotive and the new Diesels.

The proposed turbine locomotive was purposely made of about 2,500 to 3,000 hp. capacity so it would compare in capacity with many of the 4-6-2 and 4-6-4 type locomotives now in operation on various railroads in fast passenger service. Such locomotives have cylinders 25 in. to 26 in. in diameter and 28 in. stroke and carry steam pressures of 210 to 225 lb. The driving-wheel diameter varies from 75 in. to 80 in. and the starting force from 40,000 to 45,000 lb. without booster, which would add 10,000 to 12,000 lb. if used. They have outside crank pins, rods, crossheads, guides and valve-gear equipment with grease or oil lubrication which is exposed to the dust and weather and requires rigid and frequent inspection and maintenance to prevent failure, particularly when these locomotives are on long runs in high-speed service.

Such locomotives would weigh in round figures 600,000 to 650,000 lb., if they have tenders with six-wheel trucks carrying 14,000 to 15,000 gals. of water and 15 to 20 tons and sometimes more of coal. The engines would weigh 300,000 to 350,000 lb. and the tenders 300,000 lb. or more. These locomotives would have 12 or 13 pairs of wheels and would therefore have that many wheels, axles, journal bearings, brakes and spring rigging to service and maintain.

In comparison, the steam turbine locomotive would be in one unit instead of two units and would be carried on four instead of 12 or 13 pairs of wheels and therefore would have only one-third of this equipment to service and maintain. Further, the reciprocating parts on the standard locomotive would produce vibration which would cause more maintenance than the smoothly running turbines on the turbine-driven locomotive which only has two reciprocating units and these are the air compressor, which is of the piston type, but is turbine driven, and the bell ringer. The maintenance of the turbine locomotive should be less than half that required for the standard locomotive. The turbine locomotive should be able to operate at least double the mileage of the standard locomotive on long continuous runs.

One of the greatest advantages the turbine locomotive has over the standard locomotive is weight. This weight will be considerably less than half of the weight of the standard locomotive and would therefore permit heavier trains to be hauled or handle present trains at higher speeds. The cost of the turbine locomotive would be in round figures, twice as much as for the standard locomotive, but the mileage obtained from the turbine locomotive would be more than double that for the standard locomotive. If we compare the turbine locomotive with the Diesel locomotive of same drawbar horsepower, we find that the turbine locomotive can be built in one unit instead of two units and the weight will in round figures be only half the weight of the Diesel locomotive. The number of wheels, axles, journal boxes, spring rigging, brake rigging couplers connections, etc., will also be only half the number used on the Diesel.

The power plant of the turbine locomotive with its auxiliary equipment would require less maintenance than the several power plants and auxiliary equipments in the Diesel locomotive. The cost of the turbine locomotive and the cost of its maintenance would be only half that for the Diesel and the serviceability and mileage obtainable should be equal that of the Diesel.

The Diesel engine will use fuel oil and generate power at the engine shaft more efficiently than the oil burner and high pressure boiler and turbine power plant. However, the oil burner boiler can use a much cheaper grade of fuel oil than can be used in the Diesel engine satisfactorily. Further, the turbine power plant is geared directly to the driving axles and is therefore more efficient than the Diesel power plant which has considerable loss through the electric generators, motors and controlling equipment.

Also, the one turbine locomotive power plant with its auxiliary equipment will require only a fraction of the lubricating oil required by the Diesel locomotive. Therefore, when all of these items are considered, it is estimated that the combined cost of fuel oil and lubricating oil for a turbine locomotive will be practically the same as for the fuel oil and the lubricating oil for a Diesel locomotive.

The one advantage that the Diesel locomotive has over the steam turbine locomotive is its high starting tractive force, which is possible due to the characteristics of the d.c. motors and the excessive weight of the Diesel locomotive, which has to be built in two units to obtain the desired tractive force at operating speeds. Steam-turbine and Diesel locomotives of the same drawbar horsepower will have practically the same tractive force at speeds of 35 miles per hour and upward.

The steam-turbine locomotive proposed will have a starting tractive force equal to or greater than the average 4-6-2 or even the 4-6-4 standard locomotives with the booster, which is sufficient for the weight of trains these locomotives handle.

This committee has tried to submit a design of locomotive built in one unit and which would carry all its weight on the drivers and keep this weight down, in round figures, to only that required for a practical factor of adhesion for the tractive power desired.

Since the weight of this locomotive and the number of parts are kept to the minimum, the first cost and also the maintenance cost and operating cost, should be the minimum for the net drawbar horsepower developed.

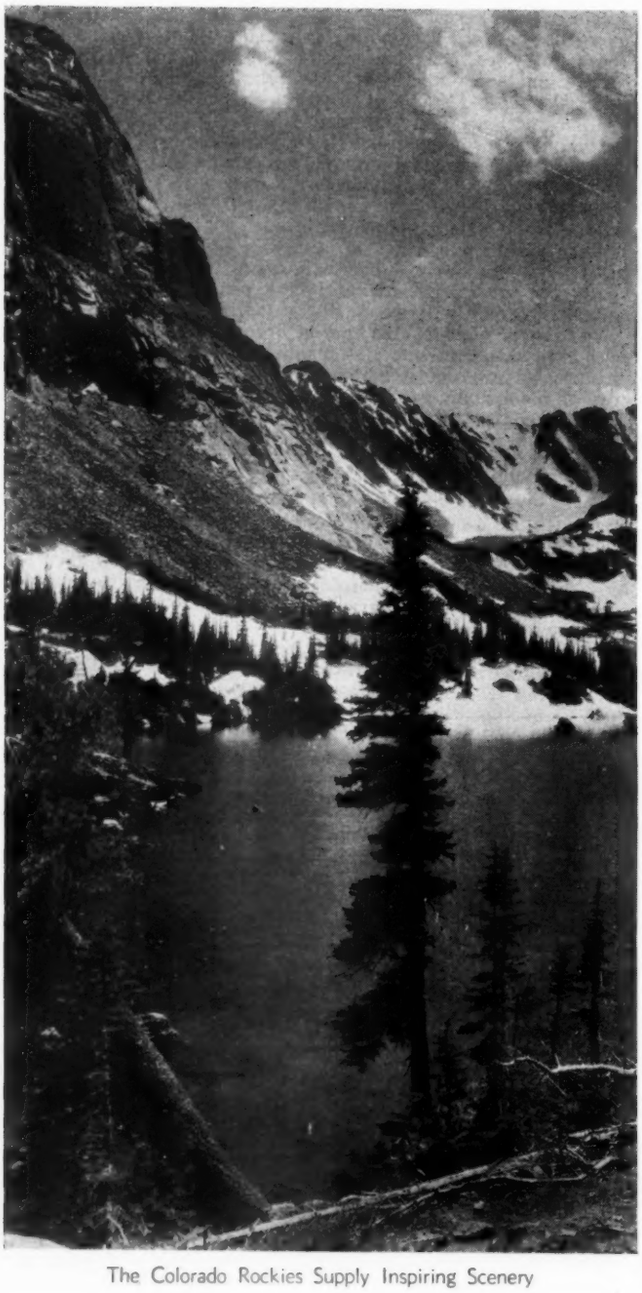
The report was signed by Chairman L. P. Michael, chief mechanical engineer, Chicago & North Western.

Motor Transport Section

Passenger Motor Transport Series — Article No. 5

Coaches Open Scenic Vistas

Rocky Mountain Parks Transportation Company co-operates with railways serving Colorado



The Colorado Rockies Supply Inspiring Scenery

CLOSE relationships and joint arrangements on the part of the Rocky Mountain Parks Transportation Company with the railways serving Colorado has resulted in getting more passengers for the rail lines and also for the motor transport company. This company, together with other subsidiaries of the Rocky Mountain Motor Company, has also co-operated with the railways in train-replacement service, and with bus-operating subsidiaries of the railways in establishing through routes and rates, to the benefit of all concerned.

During the summer season, usually from June 15 to September 20, the company operates a 250-mile circle tour through Rocky Mountain National Park, patronized largely by passengers arriving in Denver or other connecting points by rail. To promote travel to Colorado, both the railways and the bus company co-operate closely with each other. The tariffs covering this tour are filed with the Western Passenger Association, and its descriptive literature is placed in the hands of railway ticket agents, together with the right to sell transportation company tickets, providing for rail transportation to the connecting points and bus transportation beyond.

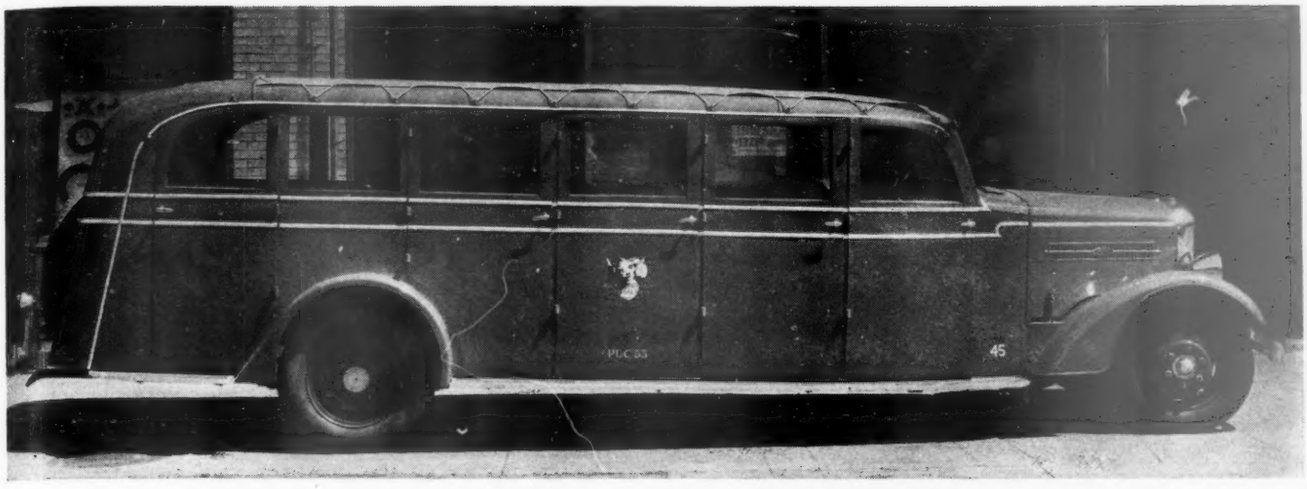
Under this arrangement, baggage may be checked through in either direction, a joint railway baggage agent being stationed at Estes Park, Colo., for this purpose. In addition, through bus-rail tickets may be purchased and Pullman reservations made at the transportation company's office at Estes Park.

The company also operates three hotels in the park, and all-expense tours of from two to six days are a feature of the service. Tickets for bus transportation and coupons for meals and lodging are sold by the five or six railways specializing in all-expense tours and having tour bureau offices in eastern cities.

Besides Denver, rail connections are made by the Rocky Mountain Parks Transportation Co. at Greeley, Ft. Collins and Boulder with the Union Pacific, at Lyons, Longmont, Ft. Collins and Loveland with the Burlington-Colorado & Southern, and, on the west side of the park, at Granby, with the Denver & Salt Lake and with such trains of the Denver & Rio Grande Western as use the Dotsero cutoff.

The summer tours are in addition to the all-year round service operated by this company between Longmont and Estes Park, handling passengers and mail.

The trip through the park is one of scenic grandeur and passes of 12,000 ft. elevation are traversed. The company has operated as many as 90 buses daily over the route, but the average last season was about 30.



Modern Streamlined Equipment Is Used by the Transportation Company

To meet the rather strenuous needs of mountain operation, the company maintains a large fleet of trucks, having standardized on Whites for maintenance and operating reasons. For this season's operations, 15 new, streamlined, 14-passenger White Indianas were purchased. All of the sightseeing coaches are equipped with roll-away tops.

Some idea of the mileage run by these coaches may be gained from the fact that, in 1934, a relatively light season, more than 8,000 passengers were handled through the parks in 2½ months.

The extra drivers for the summer season are recruited principally from among the students of the numerous nearby colleges and universities. Before they are employed, however, they must pass rigid physical examinations and safety tests, the latter including actual driving in the mountains under supervision. Most of these drivers return each year until they have completed their education, so that, while the turn-over in summer drivers is inevitably large, there remains each year a nucleus of thoroughly experienced drivers about which the organization may be built up.

The Rocky Mountain Motor Company is the parent organization of the Rocky Mountain Parks Transportation Company. There are numerous subsidiaries, all working closely with the railways. In view of the fact that the company operates a taxi service and hotels as well, it more or less represents, with its close rail affiliations, Commissioner Eastman's ideal of complete, coordinated transportation service, including the feeding and lodging of the passenger while away from home. As a matter of fact, the company was not originally in the hotel business, taking up this phase of activity only recently, when the existing hotel facilities became inadequate.

Among the rail co-ordination activities engaged in by this company's subsidiaries is a considerable train replacement service. It has taken over the entire passenger service of the Burlington-owned Denver & Interurban, operating between Denver and Boulder, 35 miles, replacing the trains with buses, which use the station of the Rocky Mountain Parks Motor Company, at Denver, and are operated under its management. The company has also taken over the entire passenger service of the narrow gage line of the Colorado & Southern between Denver and Silver Plume, 53 miles, having replaced all passenger trains on this line with its motor coach service.

The transport company also maintains close relationship with the motor coach operating subsidiaries of the railways. The Interstate Transit Lines, a Union Pacific subsidiary, uses the Rocky Mountain Motor Company bus terminal at Denver. On April 16 of this year, joint service between Denver and Cheyenne was established with the Burlington Transportation Company, the operation between Denver and Ft. Collins being under control of the Colorado Motorway, a Rocky Mountain Motor Company subsidiary, while the remainder of the route, between Ft. Collins and Cheyenne, is under Burlington management. At Cheyenne, connection is made with the Burlington's transcontinental bus line, and joint schedules and through tickets are in effect via this route between Denver and Chicago.

On the Road to Rocky Mountain Park

Santa Fe Buys Southern Kansas Stage Lines

THE Atchison, Topeka & Santa Fe, through its affiliate, the General Improvement Company, has purchased a controlling interest in the Southern Kansas Stage Lines Company, according to an announcement made on September 21 by S. T. Bledsoe, president of the railroad.

The Southern Kansas Stage Lines operates a network of bus and truck lines in Kansas, Oklahoma, Missouri and Colorado, and is also interested in other companies with highway operations in Missouri, Illinois, New Mexico, Arizona and California.

All-Wheel-Drive Ford V-8 Truck

MARMON-HERRINGTON has applied its all-wheel-drive principle of design and construction to the Ford V-8 truck by installing specially-designed driving front axle and propeller shaft, a two-speed auxiliary transmission and other necessary parts.

Marmon-Herrington Drive Ford V-8 in Action on Rough Test Road

Engineering and experimental work has been under way for months and numerous models have been on the road in actual service and have been tested on the Indianapolis Motor Speedway.

The Marmon-Herrington Company has started production on four models. Two are four-wheel-drive units. These are the B5-4 with wheelbase of 132 in., selling at $1,295 at the factory, and the B6-4 with wheelbase of 157½ in., selling at $1,345 at the factory. In addition, there are two six-wheel-drive units. The four-wheel-drives have a maximum gross capacity of 13,200 lb. and the six-wheel-drives a maximum gross capacity of 22,000 lb.

Santa Fe Plans Motor Service Across Bay Bridge

THE Santa Fe Transportation Company has applied to the California Railroad Commission for a certificate of public convenience and necessity to operate an auto trucking and stage service over the San Francisco-Oakland Bay bridge between San Francisco, Cal., Oakland and Richmond upon the completion of the bridge. The service will be confined to passengers and freight handled by the Atchison, Topeka & Santa Fe by rail and ferry between present stations and terminals of that railroad. The application states that neither the Santa Fe Transportation Company nor the railroad company proposes an interurban passenger service.

In its application the company sets forth the following reasons why it believes the application should be granted: "Such use of motor buses and trucks upon the completion of said bridge in lieu of existing service will afford the Atchison, Topeka & Santa Fe a means of meeting competition and give to the public generally the benefit of direct, speedy and convenient service and will effect a probable saving in expense to the Atchison, Topeka & Santa Fe. Such service is necessary in the interest of the general public. The California Toll Bridge Authority, in charge of the construction and operation of such transbay bridge, is agreeable to allowing applicant to perform such service over the bridge."

Burlington Buys New Coaches

FOR the extension of its lines from Cheyenne, Wyo., to Casper, Cody and Billings, the Burlington Transportation Company required a low-cost unit for long distance motor coach travel. The type of equipment selected for this service was a Chevrolet 11-passenger sedan bus, with a special body built by the FitzJohn Body Company of Muskegon, Mich. Four of these coaches were purchased by the Burlington.

These sedan-buses were constructed by extending the Chevrolet master sedans and installing two additional cross seats, heavier rear springs, heavier coils in the front knee-action units, etc. The shaft extension is in two parts, complete with cross members, housed roller bearings, and universal joints. As converted, the coaches have a wheelbase of 184 in., and the seats are set on 39 in. seat centers. These coaches average about 17 miles to the gallon in regular service, and the other operating costs are correspondingly low.

Four Chevrolet Sedan-Buses, with FitzJohn Bodies, Purchased by the Burlington

Motor Carrier Act Effective Oct. 1

Effective date of rate and tariff sections, however, postponed by I.C.C. to December 1

WASHINGTON, D. C.

ON October 1 the Interstate Commerce Commission officially undertakes the administration of Part II of the interstate commerce act, the motor carrier act, 1935, but it has been necessary already to postpone the effective date of several of its most important sections to December 1.

Since the act was signed by the President on August 9 the probable effect of commission regulation of interstate highway transportation on the railroads, the motor carriers, and the shippers has been a subject of great interest and anticipatory discussion, resolving itself into much speculation as to the extent to which it will benefit the railroads and the transportation situation generally, but it has already become apparent, if it was not before, that a considerable period of development will be required before any accurate appraisement of its expected benefits can be made. It is one thing to pass a law, even if it takes ten years to get it through Congress, but the administration of such a measure raises a multitude of questions to which the answers probably will not be available for many months.

Lack of Funds Causes Delay

In this instance the changes expected to result have been further postponed because Congress adjourned on August 26 without passing the appropriation bill which would have provided $1,250,000 to meet the expense of the commission's administration of the law for the balance of the fiscal year 1936. This delayed the commission in its preparatory work of building up an organization to handle its new work and although arrangements were finally made this week to obtain funds for the purpose from the commission's general appropriation, to be replaced after Congress meets again in January, it became necessary for the commission to take advantage of a clause in the act authorizing it to postpone the taking effect of any provision, but not beyond April 1.

Accordingly the commission on September 19 entered an order extending the effective date of sections 216, 217, 218, 219 and 223 of the act until December 1. These sections deal with the filing and observance of tariffs and schedules showing rates, fares, and charges and related matters, as well as the issuance of receipts or bills of lading and the collection of charges. This action was due primarily, the commission explained, to the inability to make necessary preparations and to give the operators additional time in which to compile their tariffs.

Without having had in advance funds with which to employ additional personnel to prepare the necessary forms, rules, and regulations, or even to provide shelf space for the filing of the tariffs of two or three hundred thousand carriers in such shape that they could be practically used, the commission apparently had no other course open to it than to postpone the taking effect of the only part of the new law that required any affirmative action by October 1 or that would require any immediate tangible change in the existing situation. The commission also announced that unless there are unforeseen developments the effective date of other sections would not be postponed and that it was expected that forms to be used in applying for certificates of public convenience and necessity, permits for contract carriers, and brokerage licenses would be ready for distribution prior to October 1. After that the law allows 120 days for the filing of such applications and during that period and thereafter until the commission has passed upon them carriers already in operation may continue to operate as they have been doing.

To Add 600 Employees to I.C.C. Staff

Before October 1 the commission also is expected to announce definitely the form of the organization of its Bureau of Motor Carriers which heretofore has been discussed in tentative form.

Every effort had been made by the commission to be forehanded and move as promptly as possible in carrying out the many new duties imposed upon it. Immediately after the act was approved it announced the creation of an additional division, to which it assigned the work and functions arising under the act, and the organization of a new Bureau of Motor Carriers. A tentative plan or organization was drawn up which contemplated the addition of some 600 employees to the commission's staff, more than one-third of the number of its previous organization, and arrangements were made for an appropriation, which was included in the deficiency appropriation bill passed by the House shortly before the adjournment of Congress, but was held up in the Senate by a filibuster by the late Senator Long. It is recalled that an appropriation for the Railroad Administration, while the government was operating the railroads, was similarly held up by a filibuster in 1919.

This appropriation bill had provided that the money should become immediately available and it was hoped that the act could be made fully effective on October 1. After a conference at the White House on August 27 it was announced that funds would be provided but delay in obtaining final approval of the plan from the Bureau of the Budget made it impossible to employ more than a skeleton force.

The Commission's Motor Carrier Organization

Pending certain other necessary arrangement of functions, the division will be known as Division 7—Motor Carriers. At the outset Commissioner Eastman, who had drafted the bill and worked closely with Congressional committees in the work of perfecting and amending it, was appointed to serve as chairman of the new division, until the organization of the commission for the administration of the act has been developed, provided he finds that such duties will not interfere with his duties as federal co-ordinator, and Commissioners Lee and Caskie have also been appointed to the division. John L. Rogers, who had been executive assistant to Co-ordinator Eastman, was appointed as director of the Bureau of Motor Carriers.

Commissioner Eastman told the appropriations committee that the commission had agreed, broadly speaking, on a self-contained unit for its Bureau of Motor Carriers, but that there were some differences of opinion as to whether certain phases of the work could or could

not be handled to advantage by the use of existing bureaus of the commission. His own opinion was that there should be a self-contained bureau, that that is what the motor carriers and the shippers want, and that "we should start out on that basis and try to keep it from being diverted into channels which had been accustomed merely to the handling of railroad matters." It is quite clear, he said, that in the administration of the act a greater degree of decentralization will be necessary than in the case of railroad regulation, and that opportunities must be provided for intimate local contacts with the carriers to be regulated. A great deal of the work of the kind ordinarily done by examiners of the commission, in holding hearings, writing preliminary reports, etc., will be done by joint boards of state commissions.

The tentative plan provided for an organization in the field for maintaining direct and intimate contact with thousands of small operators, and a Washington staff composed of technicians who will handle various phases of the work. For the Washington staff it was proposed to have separate sections within the bureau dealing with certificates, traffic, accounts, formal cases, safety, and legal matters, with a total of about 300 employees, and for the field organization 16 district offices located in strategic points throughout the country, each with a man to be in contact with the joint boards, an expert rate man and an accountant, and a number of supervisors. The supervisors would also be policing officers, with the assistance of the state commissions and local organizations of motor operators.

First Find the Trucks

The act imposes upon the commission many new duties of large proportions. One of the principal difficulties is indicated by the estimates of the number of motor carriers which will come under its jurisdiction. No one knows exactly what the numbers are because there have been no comprehensive reports to public authority. Mr. Eastman gave Congress an estimate, based on the information obtained from registrations under the N.R.A. code, that there are in the neighborhood of 325,000 common carrier and contract carrier tucks engaged in interstate commerce and something like 200,000 operators of those trucks, an average of less than two per operator. Then there are about 700 bus operators and an unknown number of transportation brokers in the motor carrier field subject to regulation. Also the safety provisions of the act which apply to private trucks as well as to the common and contract carriers, will add something like 400,000 more trucks to the number under the commission's jurisdiction. For a time it is expected to be a difficult undertaking even to locate all the trucks subject to regulation, although fairly complete information is available as to the bus operators.

In a statement issued after the bill had been signed, Commissioner Eastman warned that "too much ought not be expected from it," although he said he thought the legislation was going to have a very beneficial effect on the whole transportation system. "I think it will help the railroads and also help the bus and truck industries," he said, "and will not eliminate competition in the transportation field. The chief beneficial effect it will have will be in stabilizing conditions by preventing demoralizing and destructive competition. It ought to lay the foundation for sound future development in transportation and bring about better cooperation and co-ordination in that industry." "It doesn't mean, necessarily," he added, "that truck and bus rates will be increased, except where they may be below a sound level."

Although for many years the railroads had been regarded as the principal proponents of legislation for the regulation of motor transportation and they had worked actively for its passage, the bill as passed differs in many respects from one they might have written, particularly as to several exemptions covered by amendments adopted during the final consideration on the floor of the House. The bill is so long that many persons who have examined it only casually have overlooked many important qualifications in its details.

It was not passed until after it had become generally accepted as necessary in the public interest, had been advocated by the Interstate Commerce Commission and by Co-ordinator Eastman on that ground, and had finally come to be advocated by organizations representing the truckers themselves in their own interest. The bus operators had for many years urged a policy of regulation, and it is noteworthy that the President signed the bill with a pen furnished by the American Trucking Associations, Inc.

Mr. Eastman's Ideas as to Effects of Regulation

In one of his reports on the subject Mr. Eastman had given his idea of the effects of the proposed legislation as follows:

> It is likely that regulation will somewhat lessen the flexibility of truck operations and set up requirements which small or poorly financed operators will not be able to meet. But it should confer benefits on the trucking industry which will more than compensate for these losses, by promoting a more orderly conduct of the business, lessening irresponsible competition and undue internal strife, encouraging the organization of stronger units, and otherwise enabling the industry to put itself on a sounder and more generally profitable basis. It will also enable the common carrier to strive more effectively for his share of the business, through proper recognition of the greater responsibility which he assumes and by reducing the number of pseudo-contract operations, which in the past have sought the more profitable business, leaving to the common carrier more generally the small freight and the responsibility of furnishing scheduled service the year around. It will also tend to reduce the friction which now exists by reason of conflicting state laws and regulations.
>
> It may be urged that regulation will encourage private trucking and thereby work a serious injury to the for-hire sections of the industry. There is little reason to believe that important injury would result. As the legislation proposed would debar the private operator from transporting freight for hire, unless he submits to the regulation proposed for for-hire operators, his opportunity to fill up outbound loads and to pick up for-hire traffic on return trips would be materially limited. Such a restriction is justified for the protection of the common carrier upon whom the general public must depend.
>
> This change would reduce the radius of operation of the strictly private carrier, except where, for example, he can carry his own products out and bring back raw or semifinished products or other supplies for his own use. There is also the likelihood that, by making the rates of common and contract carriers both stable and known, regulation will discourage such private operations as have been entered into because of the uncertainties and irresponsibility attaching to much of the existing for-hire service. The possibility of private operation will, however, set limits to rates, both for the railroads and for the common carrier and contract trucks, and if these limits are not observed, there will be a material increase in private operation.

Motor Transport Is Still Subsidized

Restoration to the railroads of some of the large volume of traffic that has been diverted from them to unregulated bus and truck carriers that do not have to provide their own right of way and terminal facilities is of course the major effect of the law hoped for by the railroads but the extent to which this will be accomplished and how long a period will be required for results to be shown will depend in large degree upon the way the administration of the law works out in actual practice. No change in the "subsidy" situation has been made by the law.

Naturally one of the questions in which most interest is manifested relates to the kind and level of the rates to be applied to truck transportation but no answer

is expected to be available for some time. The principal effect at the outset, after the sections of the law pertaining to rates and tariffs become effective, is expected to be in the direction of stabilization because of the requirement that tariff rates be published and adhered to. This will at least enable the railroads to know what their competition is and make it possible for them to decide whether to meet it and what rates would be necessary to do so. It will also tend to eliminate some of the pressure exerted by shippers and the practice of quoting whatever rate may be necessary to attract a particular piece of business, just below the rail rate, at a time when it is too late for the railroad to meet the reduction, and the practice of making especially low rates for return hauls.

Railroads have been handicapped in meeting motor competition by the requirement that they adhere to published tariffs while their competitors were not so restricted, and by the fact that when it was decided to make truck competitive rates it was often necessary to reduce many more rates than the direct competition would require, although the commission in the last two or three years has been fairly liberal in permitting reductions.

Rate Basis Not Determined

No one can now say what will be the relation between truck and rail rates after the regulatory processes have become somewhat established, but it is certain that regulation will eliminate most of the especially low rates. Although truck costs are much higher than the average rail rate per ton-mile much of the truck transportation is conducted not in competition with average rail rates but with rates on commodities which may take two or three times the average rate and, in many instances, in competition with a rail haul plus two truck hauls, to and from the railroad terminal. Mr. Eastman has had a good deal to say about the necessity for making both rail and truck rates in the future more in relation to cost but the trucking industry seems to hold very divergent opinions on the subject and a large element is in favor of patterning the rates to a large extent on the rail tariffs. Comprehensive truck cost data is still lacking and in many ways costs will be increased under regulation.

As one measure of the possibilities, the "Merchandise Traffic Report" issued by Co-ordinator Eastman's Section of Transportation Service last year suggested that over 3,000,000 tons of merchandise are moving by highway for distances between 50 and 250 miles, and that approximately 10,000,000 tons of l.c.l. freight are being hauled by rail for distances under 50 miles, the bulk of which could be more efficiently handled by highway. Co-ordination as a supplement to modernized service and tariffs, the report said, would result in the exchange of this tonnage so that there should be returned to the rails at least 10,000,000 tons of long-haul traffic now moving by highway, and there should be diverted to the highway an equivalent amount of short-haul tonnage now moving by rail.

Many Truckers Want Rail Rates

Efforts have been made through American Trucking Associations, Inc., to bring about some sort of agreement on a policy of rate-making and tariff publication but after several meetings the association's national rates and tariff committee found the problem too knotty for immediate solution and postponed it for another "field day" meeting, to be held after the association's convention at Chicago on October 14-15, before issuing any definite recommendations to the industry. At its first meeting the national committee adopted a resolution as a sort of "trial balloon" recommending that truck rates be developed "on a basis of reasonable truck operating costs, plus a reasonable profit, and applied under a truck classification of commodities." The subject was then taken up at a series of meetings of state and regional committees which developed many conflicting opinions, some favoring the truck cost basis, but many others favoring a rail rate basis, with exceptions, with rail or truck classification, or tariffs based on what the traffic will bear. Many variations of these plans and others, particularly one calling for rates based on the factors of truck operation, applied under a railroad freight classification, were advocated in communications to the committee and by carriers who appeared before it. Of the reports received from the states at national headquarters, 10 favored truck costs and truck classification, 20 favored rail rates and classification, and several others advocated truck costs under rail classification. Most of the recommendations in favor of the use of rail classification, however, urged the inclusion of truck exceptions. In advocating the use of rail rates and rail classification, it was pointed out that such a plan would be productive of co-ordination among the various agencies of transportation, one of the underlying principles of the motor carrier act. It was further suggested that the trucking industry never could hope for the abandonment of the use of truck-competitive rates by the rails as long as trucking rates were figured on a basis other than rail rates.

In the absence of any agreement various operators or groups of operators will file their own tariffs on whatever basis they choose, leaving any general policy or method to be developed gradually under the influence of the commission's decisions in particular cases brought before it, although it is likely that they will arrange for group tariff-filing agencies similar to those of the railroad traffic associations. There is as yet little indication as to what the commission's attitude will be regarding the relation between rail and truck rates.

Elimination of Irresponsible Truckers Expected

One of the principal results expected from regulation is the gradual elimination of the irresponsible "fly-by-night" trucker and his disturbing effect on the business both of railroads and the more highly organized truckers, although in some quarters the idea is held that a reduction in the number of such competitors and the curtailment of destructive competitive practices will tend to strengthen and promote the establishment of organized trucking companies on a large scale fully as much as it will help the railroads. The numerous requirements and restrictions incident to regulation are expected to discourage many of the smaller operators but on the other hand it is believed that the general quality of the business will be improved and made more dependable as a result of regulation to the end that its competition may be made more difficult for the railroads to meet on a service basis at the same time that the difficulties of meeting its rate competition are lessened.

The regulation, except as to certain requirements in the interest of safety, does not apply to private truck carriers, defined in the act as those who transport "property of which such person is the owner, lessee, or bailee, when such transportation is for the purpose of sale, lease, rent, or bailment, or in furtherance of any commercial enterprise." Of course if a private truck takes on a return load for hire, it loses its private status. A great deal of freight is being hauled in competition with the railroads as well as with other established businesses by truckers who purchase or otherwise ac-

quire loads of coal, hay, other agricultural products or other articles and attempt to peddle them directly.

Many Trucks Exempted

An important feature of the legislation as finally passed was the extent of the exemptions included. Except in the important particular of regulations pertaining to safety the law exempts vehicles engaged exclusively in carrying live stock, fish, or agricultural commodities, (not including manufactured products thereof), or in the distribution of newspapers. There is also a specific exemption of vehicles controlled and operated by farm co-operative organizations, and the "casual, occasional or reciprocal" transportation for compensation by any person not engaged in transportation by motor vehicle as a regular occupation or business, and carriers which operate only within metropolitan areas are conditionally exempted. However, the number exempted will be considerably reduced by the use of the word "exclusively." One of the principal fields in which the competition of truck transportation has been felt by the railroads has been that of live stock and agricultural products, but it is believed that the extent of such competition has been greatly increased by the fact that such truckers heretofore have been able to supplement the revenues received for the primary transportation by making very low rates on occasion for return hauls of various commodities. There is also an exemption of motor vehicles controlled and operated by any farmer, and used in the transportation of his agricultural commodities and products thereof, or in the transportation of supplies to his farm.

Regulation to Be Comprehensive

In the regulation of common carriers, in addition to rate regulation, the commission may establish "reasonable requirements with respect to continuous and adequate service, transportation of baggage and express, uniform systems of accounts, records and reports, preservation of records, qualifications and maximum hours of service of employees, and safety of operation and equipment." The similar statement as to contract carriers omits reference to service, and that as to private carriers refers only to the safety features. The commission may also establish reasonable requirements for transportation brokers, as to their financial responsibility, accounts, records, reports, operation and practices.

Provisions as to Rate Regulation

Comprehensive regulation of the rates, fares, and practices of common carriers by motor vehicle is provided for, and a lesser degree of regulation for the charges of contract carriers. Rates of common carriers are required to be just, reasonable and non-discriminatory, to be published, posted, filed with the commission, and strictly observed, and they may be changed by the commission if, after hearing, they are found to be unlawful. In the case of contract carriers the commission may prescribe the minimum rates.

Common carriers are required by Section 217 to file with the commission and keep open to public inspection tariffs showing all rates, fares and charges and adhere to them, and changes may not be made except after 30 days' notice, except on permission of the commission. Contract carriers are required to file and publish schedules, or, in the discretion of the commission, copies of contracts containing their minimum charges and no contract carrier may engage in transportation unless its minimum charges have been published, filed and posted. No reduction is to be made in any such charge except upon 30 days' notice, except that the commission may allow changes upon less notice. The law includes a provision very similar to that of the railroad law prohibiting any undue or unreasonable preference or advantage to any particular person, port, gateway, locality or description of traffic, or any unjust discrimination or undue or unreasonable prejudice or disadvantage, but the authors of the law were careful to insert a proviso that this shall not be construed to apply to discriminations, prejudice or disadvantage to the traffic of any other carrier of whatever description.

In the case of common carrier rates the commission is authorized, on complaint or on its own initiative, after hearing, to prescribe the lawful rate, or the maximum or minimum, or maximum and minimum, "giving due consideration, among other factors, to the inherent advantages of transportation by such carriers; to the effect of rates upon the movement of traffic by such carriers; to the need, in the public interest, of adequate and efficient transportation service by such carriers at the lowest cost consistent with the furnishing of such service; and to the need of revenues sufficient to enable such carriers, under honest, efficient, and economical management, to provide such service."

Through Routes and Joint Rates

To bring about greater co-ordination provision is made for through routes and joint rates with other motor carriers or with carriers by railroad, express, or water, and the commission may prescribe such through routes and joint rates and the terms and conditions on which such through routes shall be operated, and equitable divisions.

Any person, state board, organization or body politic may make complaint to the commission regarding the rates of common carriers and the commission may suspend such rates pending investigation for 90 days and an extended period of 90 days more. The suspension provisions, however, do not apply to any initial schedules or contracts filed when the law takes effect.

At the last minute Congress inserted a proviso that nothing in the act should empower the commission to prescribe or in any manner regulate rates for intrastate transportation, under the Shreveport doctrine, for the purpose of removing discrimination against interstate commerce or for any other purpose whatever.

In the case of rates of contract carriers, if the commission finds that the charge contravenes the general policy of the act, it may prescribe such minimum as in its judgment may be necessary or desirable in the public interest. Since a shipper who has entered into a contract would hardly be expected to complain that it was unreasonably high, the purpose is to protect common carrier transportation by preventing charges that are too low and the act provides that such minimum charge shall give no advantage or preference to any such contract carrier in competition with any common carrier which the commission may find to be undue or inconsistent with the public interest and the declared policy. Upon complaint of "interested parties" or on its own initiative the commission may suspend the operation of a schedule or contract of a contract carrier for 90 days, pending investigation, and may extend the period of suspension to 180 days.

Certificates, Permits, Licenses

One purpose of the act, although not so stated specifically, is gradually to bring about a curtailment of the present oversupply of transportation to the extent required by public convenience and necessity, no reference being made to the effect on competing forms of transportation.

Section 206 therefore provides that no common carrier by motor vehicle subject to the act may engage in any interstate or foreign operation on any public high-

way unless there is in force with respect to such carrier a certificate of public convenience and necessity issued by the commission authorizing such operation.

Section 207 provides that, subject to section 210, a certificate shall be issued to any qualified applicant therefor, authorizing the whole or any part of the operations covered by the application, if it is found that the applicant is "fit, willing, and able properly to perform the service proposed and to conform to the provisions of this part and the requirements, rules, and regulations of the commission thereunder, and that the proposed service, to the extent to be authorized by the certificate, is or will be required by the present or future public convenience and necessity." No such certificate is to be issued to common carriers of passengers for operations over other than a regular route or routes, and between fixed termini, except as they may be authorized to engage in special or charter operations, but fixed termini are not necessarily to be required for freight carriers.

Any certificate shall specify the service to be rendered and the routes over which, the fixed termini, if any, between which, and the intermediate and off-route points, if any, at which, and in case of operation not over specified routes or between fixed termini, the territory within which, the motor car is authorized to operate. At the time of issuance and from time to time thereafter the commission is to attach to the exercise of the privileges granted by the certificate such reasonable terms, conditions, and limitations as the public convenience and necessity may from time to time require, including terms, conditions, and limitations as to the extensions of the route or routes, and such as are necessary to carry out the requirements as to safety. Occasional deviations from the route are to be permitted under general or special regulations.

Section 209 provides for the issuance of permits authorizing the holders to engage in the business of a contract carrier. Permits for contract carriers are to be issued on findings similar to those for certificates for common carriers, and that the proposed operation to the extent authorized "will be consistent with the public interest and the policy declared in Section 202." The commission is to specify in the permit the business of the contract carrier and the scope thereof and attach to it, at the time of issuance, and from time to time thereafter, "such reasonable terms, conditions and limitations consistent with the character of the holder as a contract carrier as are necessary to carry out the requirements of the commission."

Section 210 provides that no person, after January 1, 1936, shall at the same time hold a certificate as a common carrier and a permit as a contract carrier authorizing operation over the same route or within the same territory, unless for good cause shown the commission shall find that such certificate and permit may be held consistently with the public interest and with the policy declared in Section 202.

"Grandfather Clause"

Whatever may eventually be the effect in the direction of a reduction in the number of those engaged in motor transportation, however, the results will hardly be available for a long time because under the "grandfather clause" in sections 206 and 209 the commission is required to issue certificates or permits without further proof and without further proceedings, if the carrier or its predecessor in interest was "in bona fide operation," as a common or contract carrier by motor vehicle on June 1, 1935, over the route or routes or within the territory for which application is made and has so operated since that time." And if such carrier was registered on June 1, 1935, under any code of fair competition requiring registration, the fact of registration shall be evidence of bona fide operation. Pending the determination of any such application the continuance of the operation will be lawful. Moreover, others engaged in interstate or foreign commerce as common or contract carriers when the law takes effect may continue such operation for a period of 120 days without certificate or permit, and if application is made within the period, may, under such regulations as the commission shall prescribe, continue such operation until otherwise ordered.

Transport Brokers Must Obtain Licenses

Transportation brokers are required to obtain licenses from the commission, but those in operation when the law takes effect may continue their operation for 120 days without a license.

Certificates, permits and licenses are to remain in effect until terminated but may be amended or revoked upon application of the holder, in the discretion of the commission, in whole or in part, or may upon complaint, or on the commission's own initiative, after notice and hearing, be suspended, changed, or revoked, in whole or part, for wilful failure to comply with any provision of the act, or with any lawful order, rule, or regulation of the commission, or any term, condition or limitation of such certificate, permit, or license.

Sections 213 and 214 provide for commission approval of consolidations, mergers and acquisitions of control of motor carriers, and of the issuance of securities. As a safeguard against monopoly, it is provided that if "a carrier other than a motor carrier" is the applicant for approval of a consolidation, merger, purchase, lease, operating contract, or acquisition of control, the commission shall not enter such an order unless it finds that the transaction proposed will promote the public interest by enabling such carrier other than a motor carrier to use service by motor vehicle to public advantage in its operations and will not unduly restrain competition.

The commission is authorized to require annual, periodical, or special reports from all motor carriers, to prescribe the manner and form in which such reports shall be made, and to require from such carriers specific answers to all questions upon which it may deem information to be necessary. The commission may also, in its discretion, prescribe the forms of any and all accounts, records, and memoranda to be kept by motor carriers, and will at all times have access to such records.

No certificate or permit is to be issued to a motor carrier or remain in force unless such carrier complies with such reasonable rules and regulations as the commission shall prescribe governing the filing and approval of surety bonds, policies of insurance, qualifications as a self-insurer, or other securities or agreements.

Hours of Service

One advantage which motor carriers have had in their competition with the railroads has been that they have been able to hire employees at lower wages and for longer hours than those of railroad employees. The new law provides that the commission may establish reasonable requirements with respect to qualifications and maximum hours of service of employees, in the interest of safety, although there is no provision relating to wages. The requirements as to qualification and maximum hours may be applied, if need therefor is found, to private carriers as well as to common and contract carriers. The commission is also authorized to investigate and report on the need for federal regulation of the sizes and weight of motor vehicles and of the qualifications and maximum hours of service of employees.

NEWS

Pullman Company Opposes Wide Fare Differentials

Files with I. C. C. statement of exceptions to Examiner Koch's proposed report

The Pullman Company has filed with the Interstate Commerce Commission a statement of exceptions to the proposed report by Examiner Irving L. Koch of the Interstate Commerce Commission which recommended that the commission require a reduction in the standard basic fare to two cents a mile in coaches and three cents in parlor and sleeping cars without prejudice to the lower rates established by railroads experimentally, such as the one and one-half cent coach fare in effect in the South. The company says that the proposed report recommends a fare basis and a minimum spread between coach fares and those applicable to Pullman cars, which the company believes will operate to the disadvantage of passengers desiring to use Pullman service and will unduly discriminate against Pullman passengers. "To establish the principle of a minimum spread of 50 per cent, or one cent a mile, with approval of a spread of 100 per cent, or 1½ cents a mile, in the permanent fare structure throughout the country," it says, "is a procedure not believed to be in the best interests of passenger travel as a whole, as was repeatedly stated in evidence. The report enlarges the scope of an experimental fare basis and differential about which there has been much uncertainty and difference of opinion among carriers even in the districts where applicable. It finds them reasonable and lawful without adequate showing to that effect as contemplated in the statement of fundamental issues announced by the commission prior to the hearing."

The company contends that rail passenger travel should be given access to Pullman service upon a basis of transportation fares not prejudicial or discriminatory and which will encourage the use of Pullman service as well as coach service.

The western railroads have filed a statement that the record amply justifies a finding by the commission that the underlying basis of fares in western territory, including the Pullman surcharge, produces charges not in excess of reasonable maxima, and they urge that they be permitted to continue their reduced fare experiment free from the requirements of any rigid order. "The experimental application by the western lines of a lower basis of fares," they said, "has produced encouragement, but the results thereof are not yet sufficiently determinative to afford the basis of a future continuing order."

Annual Meeting of Railway Business Association

The twenty-seventh annual dinner of the Railway Business Association will be held at the Stevens Hotel, Chicago, on November 7.

Elimination of Surcharge on Coal Asked

The Baltimore & Ohio, the Pennsylvania, and the Pittsburgh & Lake Erie have applied to the Interstate Commerce Commission for authority to eliminate the 10-cent a ton emergency surcharge in rates on coal from Colona and Conway, Pa., to Youngstown, Ohio, to meet truck competition.

I.C.C. to Investigate Utah Intrastate Rates

On petition of the railroads the Interstate Commerce Commission has ordered an investigation as to the effect in interstate commerce of the failure of the Public Service Commission of Utah to permit increases in intrastate freight rates corresponding to the emergency increases authorized by the federal commission as to interstate rates in Ex Parte No. 115.

I. C. Adds Chicago-St. Louis Train

The Illinois Central, on September 29, will place the "Michigan Boulevard" in service between Chicago and St. Louis, Mo., on a 5½-hr. schedule. The train will be completely air-conditioned and will consist of coaches, parlor, lounge and cafe cars. The outstanding feature will be the cafe lounge car which has been named The Boulevard Cafe. The train will leave Chicago at 12:35 p.m. and arrive in St. Louis at 6:05 p.m.; northbound, leave St. Louis, 8:56 a.m., arrive in Chicago, 2:26 p.m.

Progress in Grade Crossing Elimination Program

Complete or partial programs for grade crossing elimination projects to be financed with the $200,000,000 allotted under the works program of the federal government have now been submitted to the Bureau of Public Roads by 26 states. These projects, of which the aggregate estimated cost is approximately $55,000,000, including between 500 and 600 crossings, have practically all been acted upon at Washington, and in many cases contracts have been awarded and construction work is beginning to get under way.

Annual Meetings of Four Mechanical Associations

Groups of that department's minor officers complete successful sessions at Chicago

Successful meetings of four associations of minor mechanical department officers were held during the week beginning September 15 at the Hotel Sherman, Chicago. The Traveling Engineers' Association and the International Railway General Foremen's Association met on September 16 and 17, the Master Boiler Makers' Association and the International Railway Fuel Association meeting on September 18 and 19. Individual rooms were provided so that each association could hold its meetings, conduct necessary business and discuss committee reports without interruption or disturbance. No exhibition of railway equipment or supplies was held in connection with any of the meetings.

The largest attendance was at meetings of the International Railway Fuel Association, a more extended account of which appears elsewhere in this issue, and of the Master Boiler Makers' Association, the total registration at each being about 125. It is a significant commentary on the earnestness of the members that many of them attended the association meetings at their own expense and with a view to securing information which would not only improve their own personal knowledge, but react to the distinct advantage of the railroads for which they work.

Master Boiler Makers' Meeting

At the business meeting of the Master Boiler Makers' Association, held September 18 and 19, the opening session was addressed by President K. E. Fogerty, general boiler inspector, C. B. & Q., after which an address was made by John M. Hall, chief inspector, Bureau of Locomotive Inspection, I.C.C. Committee reports were presented on the following subjects: "Boiler and Tender Tank Corrosion and Pitting, in Service and in Storage," Chairman J. C. Callahan, general boiler inspector, C. G. W.; "Fusion Welding as Now Applied to Boilers and Tenders," Chairman Ira J. Pool, district boiler inspector, B. & O.; "Staybolt Leakage and Cracking of Firebox Side Sheets—Methods of Prevention," Chairman M. V. Milton, chief boiler inspector, C. N.; "Application and Maintenance of Arch and Water Tubes with Their Maintenance," Chairman W. H. Moore, general foreman boiler maker, P. M.; special report on

Continued on next left-hand page

Move Freight Faster

with MODERN MOTIVE POWER!

"Speeding-up" is one way for the railroads to compete successfully against other modes of transportation.

In the speeding-up process the whole railroad must be kept running at the same fast tempo.

Modern power, without exceeding the "permissible weight" on bridges and track, increases the capacity of the railroad 25% to 30%. It assures maximum net tons per mile of road per day — maximum net earnings from the entire transportation plant.

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

LIMA LOCOMOTIVE WORKS INCORPORATED

"Fusible Plugs," by O. H. Kurlfinke, boiler engineer, S. P.

The following officers were elected for the ensuing year: President, O. H. Kurlfinke, boiler engineer, S. P.; first vice-president, Franklin T. Litz, general boiler foreman, C. M. St. P. & P.; second vice-president, Ira J. Pool, district boiler inspector, B. & O.; third vice-president, L. E. Hart, boiler foreman, A. C. L.; fourth vice-president, W. N. Moore, general boiler foreman, P. M.; fifth vice-president, C. A. Harper, general boiler inspector, C. C. C. & St. L.; secretary, A. F. Stiglmeier, general foreman boiler department, N. Y. C.; treasurer, W. H. Laughridge, general foreman boiler maker, H. V.; executive board: Secretary, John Harthill, general foreman boiler maker, N. Y. C.; M. A. Foss, service engineer, Locomotive Firebox Company; George L. Young, foreman boiler maker, Reading; C. W. Buffington, general master boiler maker, C. & O.; A. W. Novak, general boiler inspector, C. M. St. P. & P.

Traveling Engineers' Meeting

Reports presented at the thirty-eighth annual convention of the Traveling Engineers' Association, held on September 16 and 17, included "Recommended Practice for Train Handling with Modern Brake Equipment," Chairman J. P. Stewart, general supervisor of air brakes, M. P.; "The Operation of Gas-Electric and Diesel-Electric Equipment," Chairman M. D. Franey, consulting engineer, N. Y. C.; "Fuel," Chairman G. M. Boh, district road foreman of engines and fuel supervisor, Erie. The meeting was presided over by President J. M. Nicholson, division master mechanic, A. T. & S. F., necessary details of the program having been arranged by Secretary W. O. Thompson, N. Y. C. Short addresses were made by A. G. Pack, who recently retired as chief inspector, Bureau of Locomotive Inspection, I. C. C., and John M. Hall, who succeeded Mr. Pack.

At the conclusion of the business session, the following officers were elected for the ensuing year: President, A. T. Pfeiffer, road foreman of engines, N. Y. C.; first vice-president, D. L. Forsythe (retired), St. L.-S. F.; second vice-president, J. D. Clark, fuel supervisor, C. & O.; third vice-president, J. P. Stewart, general supervisor of air brakes, M. P.; fourth vice-president, J. C. Lewis, R. F. & P.; fifth vice-president, M. A. Daly, fuel supervisor, N. P. W. O. Thompson, N. Y. C., was continued as secretary.

General Foremen's Meeting

At the International Railway General Foremen's Association meeting, held on September 16 and 17, the opening address of President A. H. Keys, district master car builder, B. & O., was followed by some further introductory remarks by M. D. Franey, consulting engineer, N. Y. C. Committee reports were presented on a total of five subjects, as follows: "Shop Practice as Applied to Repairs of Modern Power," Chairman W. Medlock, roundhouse foreman, C. G. W.; "Methods of Measuring Shop Efficiency," by J. B. Dunlop, shop superintendent, C. N.; "Lubrication of Locomotives, Cars and Their Appurtenances," by F. M. A'Hearn, B. & L. E.; "Automatic Versus Adjustable Type Switches for Locomotives," by W. E. Lehr, B. & O.; "How to Establish and Maintain Safe Operation in a Locomotive Shop," by M. A. R. Slack, N. Y. C.

At the conclusion of the business session, an election of officers was held, at which Mr. Keys was urged to accept a re-election and to continue to direct the affairs of the association for the coming year. This he agreed to do and the following, therefore, were elected officers for the year 1935-1936: President, A. H. Keys, district master car builder, B. & O.; first vice-president, J. B. Dunlop, shop superintendent, C. N.; second vice-president, J. H. Fedler, general foreman, C. G. W.; third vice-president, C. F. McWilliams, general foreman, locomotive department, C. R. I. & P. William Hall, C. & N. W., was continued as secretary-treasurer.

New Haven Trains Faster

The New York, New Haven & Hartford announces that, with the new time-table of September 29, the Shore Line Express, the Colonial and the Senator will each be run through between New York and Boston in five hours, so that there will be six of the five-hour trains each way daily; and the two trains running in 30 minutes less time continue as at present. Beginning also with the new time-table, the Comet, making five trips each way on week days between Boston and Providence, will make six and, continuing to make the 44 miles in 44 minutes, will stop on each trip at Pawtucket.

Denney Elected to Eastern Co-ordinating Committee

Charles E. Denney, president of the Erie, has been elected a member of the Eastern Regional Co-ordinating Committee to succeed the late J. J. Bernet. At the same meeting of the Eastern Presidents' Conference on September 19 directors representing the East on the board of the Association of American Railroads, were re-elected. They are: F. E. Williamson, president of the New York Central; Daniel Willard, president of the Baltimore & Ohio; Edward S. French, president of the Boston & Maine; M. W. Clement, president of the Pennsylvania, and Mr. Denney.

New Equipment Installed

New freight cars installed by the Class I railroads in the first eight months of 1935 totaled 2,819, according to reports received by the Association of American Railroads. In the same period last year, 14,970 new freight cars were placed in service, and, in the same period two years ago, there were 1,838. Twenty-seven new steam locomotives and 101 new electric locomotives were placed in service in the first eight months of this year. The railroads, in the first eight months of 1934, installed six new steam locomotives and ten new electric locomotives. New freight cars on order on September 1 totaled 7,240 compared with 8,372 on the same day in 1934 and 1,129 on the same day in 1933.

The railroads on September 1 this year had on order 9 new steam locomotives and 3 new electric locomotives. New steam locomotives on order on September 1, 1934, totaled 35, and on the same date in 1933, there was one. New electric locomotives on order on September 1, 1934, totaled 106. Freight cars and locomotives leased or otherwise acquired are not included in the above figures.

Heavy Traffic into New York

Inbound passenger traffic from Chicago into Grand Central Terminal, New York, on September 23, was the heaviest in six months, according to a statement issued this week by the New York Central. More than 1,400 passengers arrived on morning trains that day; the Twentieth Century Limited and three other trains arrived in two sections each and the Commodore Vanderbilt in three sections. The heavy travel was attributed to improved business and to the attraction of the Baer-Louis fight.

The Pennsylvania also reported heavy travel into New York on that day on all trains from western and southern points, attributing it also to the fight.

Meeting of Traffic Clubs

The fourteenth annual convention of the Associated Traffic Clubs of America will be held at the Claypool hotel, Indianapolis, Ind., on October 15 and 16. The program will be as follows:

Tuesday Morning, October 15

Report of Board of Directors—H. A. Palmer, chairman
Address—"What Is the Public Interest in Transportation Regulation?" by Luther M. Walter, Interstate Commerce Counselor, Walter, Burchmore & Belnap, Chicago.

Tuesday Afternoon

Report of Speakers Committee
Report of Finance Committee
Report of Membership Committee
Report of Committee on Education and Research
Address—"The Future of Light-Weight Equipment and Power"

Banquet

Address—"Government Ownership—How Can We Be Saved?" by Harry A. Wheeler, president, Railway Business Association, and Past President, U. S. Chamber of Commerce

Wednesday Morning

Election of Officers
Address—"Education for Rail Traffic Management," by Dr. L. C. Sorrell, professor of transportation, University of Chicago.

New York-Washington, 225 Minutes

The Pennsylvania announces that with the new time-table, September 29, the schedules of 44 trains in its electrified passenger service between New York and Washington will be made faster. The Congressional Limited will make the run in three hours and 45 minutes, saving 30 minutes as compared with the time of a year ago. It will cover 225 miles in 225 minutes, including six stops. A number of other trains will closely approximate this speed, both ways. "The Senator" (through train to and from Boston) will have a schedule of three hours and 53 minutes between New York and Washington (and five hours between Boston and New York). "The President" and "The Representative" southbound, and "The President" northbound, will make the run in four hours. Between 7 a.m. and 8 p.m., there will be a total of 34 trains between New York, Washington and in-

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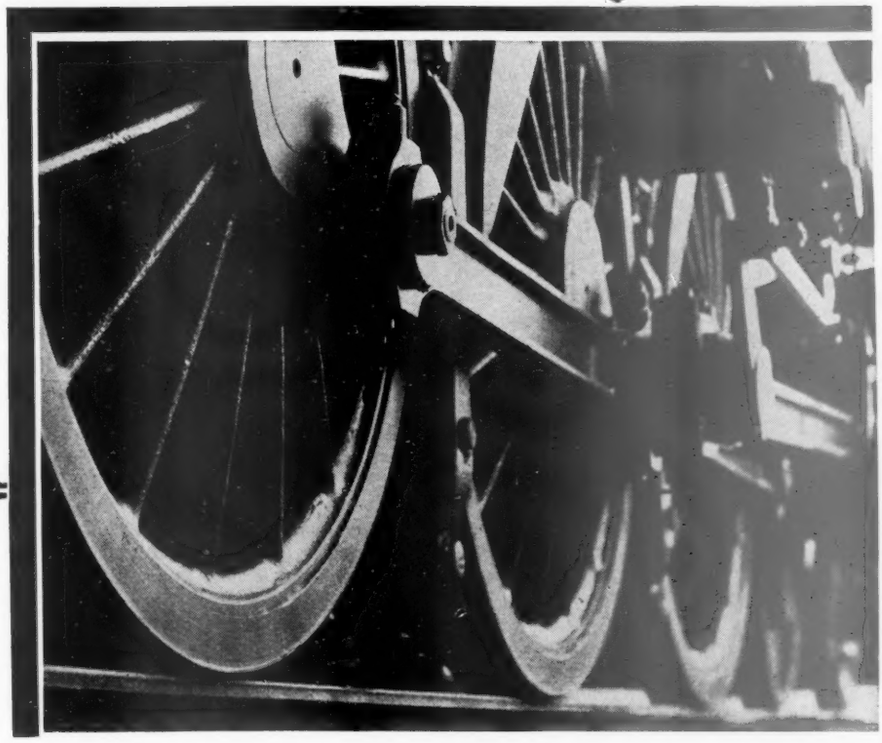
DON'T PAY FOR MORE POWER

Than You Can Use . . .

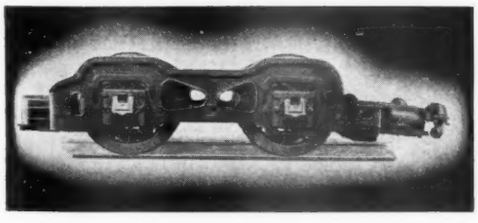


On numbers of locomotives built a few years ago application of The Locomotive Booster permits bushing the cylinders to smaller diameter without loss of locomotive capacity at speed.

On such power The Locomotive Booster provides the added tractive effort needed to get the train started and up to road speeds. The smaller main cylinders are amply adequate after the train is rolling and operate efficiently at road speed.

Smaller cylinders impose lower stresses on every part of the locomotive and correspondingly reduce maintenance.

By capitalizing idle weight and spare steam The Locomotive Booster more than pays for itself in the savings on locomotive maintenance.



Franklin parts fit—in applying them there is no labor cost for fitting. They are built to original dimensions of carefully selected materials—they avoid road failures and excessive maintenance.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

termediate cities, covering the through run in an average time of 4 hours and 10 minutes, including all stops.

The hourly trains between Broad Street Station, Philadelphia, and New York will also be quickened in each direction, with the fastest trips covered in one hour, 40 minutes. North Philadelphia and Thirtieth Street stations in Philadelphia have the service also of the through trains between New York and Washington, thus providing 56 express schedules to and from New York daily between 7 a.m. and 8 p.m.

Every train in the entire fleet over the New York-Washington electrified territory will operate on a faster run in both directions, except a very few night trains.

Steam Railway Accident Statistics June, 1935

The Interstate Commerce Commission's completed statistics of steam railway accidents for the month of June, now in preparation for the printer, will show:

Item	Month of June 1935	Month of June 1934	6 Months ended with June 1935	6 Months ended with June 1934
Number of train accidents:				
Total	500	458	3,232	3,146
(At highway grade crossings, included in total)	7	7	83	67
Number of casualties in train, train-service and nontrain accidents:				
Trespassers:				
Killed	288	277	1,204	1,172
Injured	317	343	1,432	1,446
Passengers on trains:				
Killed	...	2	8	12
Injured	135	159	955	822
Employees on duty:				
Killed	47	37	280	281
Injured	1,267	1,559	7,754	8,432
All other nontrespassers:*				
Killed	115	108	778	768
Injured	436	430	3,230	3,119
Total—All classes of persons:				
Killed	450	424	2,270	2,233
Injured	2,155	2,491	13,371	13,819

* Casualties to "Other nontrespassers" happen chiefly at highway grade crossings. Total highway grade-crossing casualties *for all classes of persons, including both trespassers and nontrespassers,* were as follows:

Killed	100	89	730	706
Injured	281	237	2,165	2,023

Railroads Speed Service Between Chicago and Twin Cities

The running times of five passenger trains operating between Chicago and St. Paul-Minneapolis, Minn., will be reduced substantially on September 29, when daylight saving time ends in Chicago, by the Chicago, Milwaukee, St. Paul & Pacific, the Chicago & North Western and the Chicago, Burlington & Quincy.

On the Milwaukee the Pioneer Limited, which now leaves Chicago at 9 p. m. and arrives at Minneapolis at 7:59 the following morning, will leave Chicago at 10:15 p. m. and arrive at Minneapolis at 8 a. m., a reduction in time of 1 hr. and 14 min. The Olympian will leave Chicago at 11:15 p. m. instead of 10:45 p. m., and will arrive at Minneapolis at 9:10 a. m. instead of 9:15, a reduction in running time of 35 min.

On the North Western the running time of the Victory Limited northbound between Chicago and the Twin Cities will be reduced 35 minutes; leave Chicago at 11 p. m. instead of 10:30, and arrive at Minneapolis at 8:50 a. m. instead of 8:55. The cars for Duluth that are carried in this train will arrive at that point at 12:05 p. m. on the following day—a reduction in running time of 40 minutes. A new night train to be called the "Fast Mail" will leave Chicago at 10 p. m. and will arrive at St. Paul at 7:55 a. m. This train will carry coach passengers but have no sleepers.

The running time of the North Coast Limited and the Empire Builder, of the Burlington, will be reduced 35 min. and 30 min., respectively, to 9 hr. 15 min. The North Coast Limited will leave Chicago at 11 p. m. and will arrive at St. Paul at 8:15 a. m.; under the old schedule this train left Chicago at 10:30 p. m. and arrived at St. Paul at 8:20. The Empire Builder will leave Chicago at 11:15 p. m. instead of 10:45, arriving at St. Paul at 8:30 instead of 8:35.

Scranton Golf Tournament

At a golf tournament of railway officers and railway supply men which was held on Wednesday, September 18, at the Scranton Country Club, Scranton, Pa., there was an attendance of 325, of which 244 played golf. Samuel MacClurkan of the American Arch Company, Inc., was chairman. Golf prizes were awarded as follows: Low gross Class A, to J. S. Doyle, Johns-Manville Corporation; low gross, Class B, R. J. Hill, National Aluminate Company; low net, Class A, John Snyder, the Glidden Company; low net, Class B, Dr. R. F. Wear, American Car and Foundry Company. Kickers' prizes went to No. 79, C. H. Brown, Lukens Steel Company, and to No. 83, Morris M. Trainer, American Brake Shoe & Foundry Company.

Bridge and Building Convention

The American Railway Bridge and Building Association will hold its forty-second annual convention at the Hotel Stevens, Chicago, on October 15-17. Following is the program.

Tuesday Morning

Address by H. G. Taylor, chairman, Western Association of Railway Executives, Chicago.
Greetings from the American Railway Engineering Association, by R. H. Ford, president (assistant chief engineer, C.R.I. & P.), Chicago.
Greetings from the Roadmasters' Association, by Armstrong Chinn, vice-president (chief engineer, Alton), Chicago.
Address of President H. I. Benjamin, vice-chairman, System Committee, Insurance, S.P., San Francisco, Cal.
Appointment of special committees and announcements.
Report of Committee on Cleaning of Steel Bridges Preparatory to Repainting; E. C. Neville, chairman (B. & B. master, Canadian National).

Tuesday Afternoon

Report of Committee on the Inspection of Bridges and Buildings in the Light of Today's Deferred Maintenance; D. T. Rintoul, chairman (general bridge inspector, S. P.).
Address on Recent Developments in the Application of Welding to Railway Bridges; by A. R. Wilson, engineer of bridges and buildings, Eastern Region, Penna., Philadelphia, Pa.
Report of Committee on The Use of Treated Timber in Buildings; L. C. Winkelhaus, chairman (architect, C. & N. W.).
Adjournment to visit exhibit of Bridge and Building Supply Men's Association.

Evening Session

Address on Trends in Bridge Design, Erection and Maintenance; by C. Earl Webb, division engineer, American Bridge Company, Chicago.

Wednesday Morning

Report of Committee on The Welding of Pipes in Water Supply and Plumbing; C. M. Burpee, chairman (research engineer, D. & H.).
Address on Making Timber Bridges Last Longer, by I. L. Simmons, engineer of bridges, C. R. I. & P.
Report of Committee on Types of Floors for Highway Bridges under Various Service Conditions with Relation to Durability, Character of Sub-floor Required, Cost and Surface Characteristics; T. H. Strate, chairman (division engineer, C. M. St. P. & P.).

Luncheon

Address by George D. Brooke, vice-president, C. & O. and N. Y. C. & St. L.

Wednesday Afternoon

Report of Committee on Relative Merits of Different Types of Pumping Equipment and Conditions under Which Each Is Most Suitable; C. R. Knowles, chairman (superintendent of water service, I. C.).
Address on the San Francisco Bay Bridges and Their Construction; by George W. Rear, (engineer of bridges, S. P.).
Round table discussion of questions submitted by members.

Thursday Morning

Report of Committee on Under Water Inspection and Examination of Railroad Structures; W. R. Ganser, chairman (master carpenter, Penna.).

Thursday Afternoon

Will be spent in an inspection of the new high-speed trains of the C. & N. W., the C. B. & Q., the C. M. St. P. & P. and the Alton.

R.E.A. on the Air

The Railway Express Agency on September 30 will inaugurate a series of 15-minute "News Parade" broadcasts over leading radio stations in 12 key cities throughout the country. This radio advertising campaign—the first conducted by the Express Agency—will continue for 13 weeks. The program, dramatizing current events of national and world-wide interest, will be broadcast from stations in Boston, Mass.; New York; Cleveland, Ohio; Chicago; Minneapolis-St. Paul, Minn.; St. Louis, Mo.; New Orleans, La.; Dallas, Tex.; Atlanta, Ga.; San Francisco, Cal.; Los Angeles and Seattle, Wash.

During each 15-minute broadcast there will be three brief commercial announcements about Express Agency service; the second, which will occur in the middle of the program, will dramatize some unusual service performed by the company.

Wideawake Conductors

Passenger conductors who in their regular runs take in "velvet" money for the company, equalling or approximating their salaries, apparently are not an unusual thing on the Baltimore & Ohio. This phenomenon is told of in the September issue of the Baltimore & Ohio magazine, as follows:

During April, May and June of this year, six conductors running passenger trains between New York and Washington turned in $2,963 in cash for transportation which they sold to passengers in their charge. Only a small part of this was from people boarding trains without tickets. By far the larger part came from careful observation and intelligent solicitation of passengers who already held tickets to their original destination, but who, these conductors knew, or felt, might be traveling further.

"There's no secret about it, as a rule," said Conductor Cole, when asked how he contributed his part. "If you make friends with people they often tell you where

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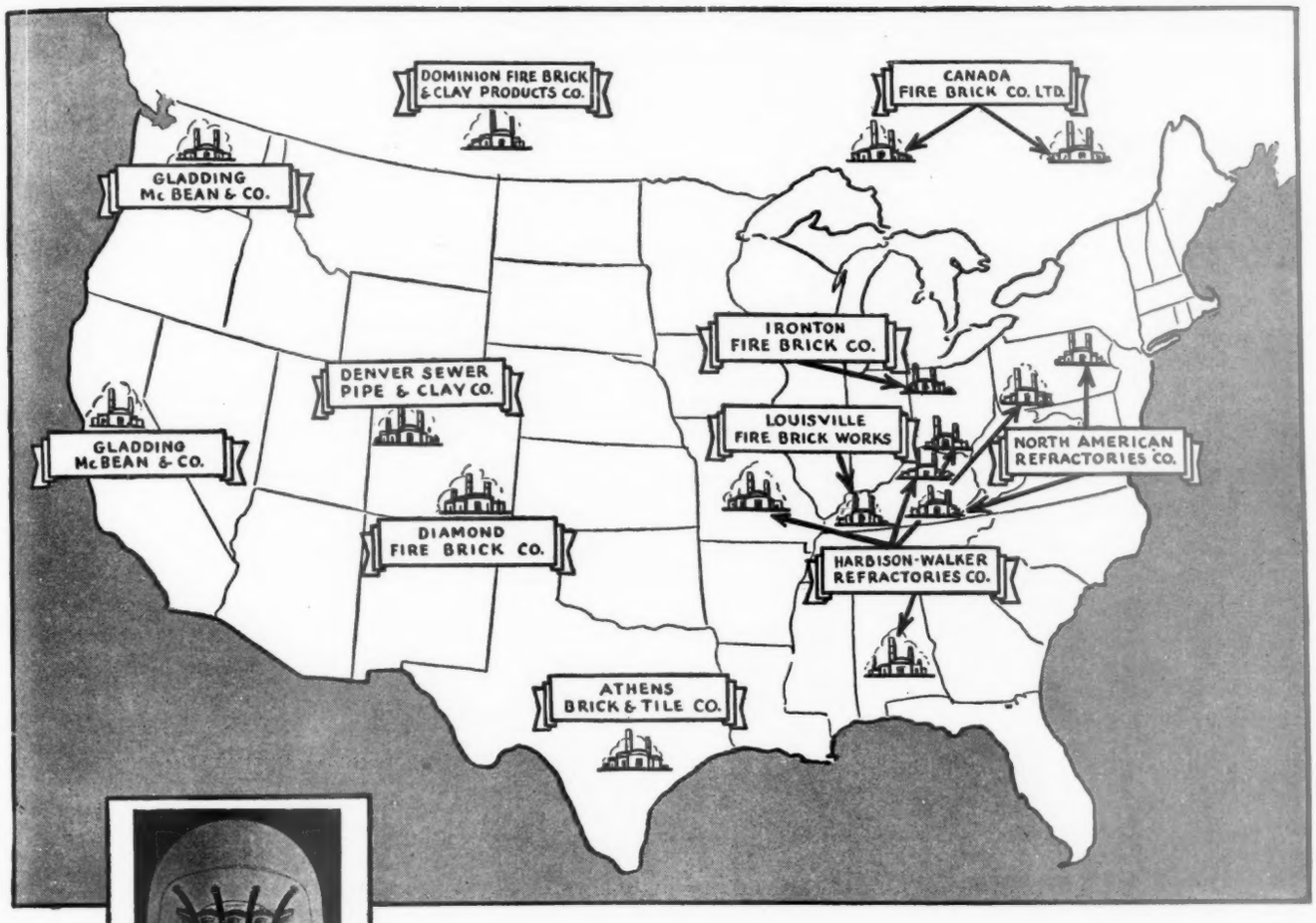
DOMINION FIRE BRICK & CLAY PRODUCTS CO.
CANADA FIRE BRICK CO. LTD.
GLADDING Mc BEAN & CO.
IRONTON FIRE BRICK CO.
DENVER SEWER PIPE & CLAY CO.
LOUISVILLE FIRE BRICK WORKS
NORTH AMERICAN REFRACTORIES CO.
GLADDING McBEAN & CO.
DIAMOND FIRE BRICK CO.
HARBISON-WALKER REFRACTORIES CO.
ATHENS BRICK & TILE CO.

There's More to SECURITY ARCHES *Than Just Brick*

SECURITY ARCH BRICK

IS PROMPTLY AVAILABLE FROM CONVENIENTLY LOCATED POINTS

Proper brick arch maintenance is essential for maximum fuel effectiveness and economy.

To facilitate Security Arch maintenance The American Arch Company maintains sources of brick supply at points convenient to every railroad in the country. These sources are indicated on the map shown above.

AMERICAN ARCH COMPANY

INCORPORATED

Locomotive Combustion Specialists

NEW YORK CHICAGO

they are going, and you get a chance to sell them some more transportation.

"For instance, there was a lady on Train 15 leaving Jersey City, without a ticket. She told me she wanted one to Washington. I always make it a practice to inquire if such passengers are going further, and this lady told me she was going to Chicago in a week or ten days. I told her if she would let me sell her a ticket through to Chicago, I would buy her a dinner. I then explained that I would buy the dinner by saving her $1.29, because a ticket to Washington and then to Chicago would cost this amount additional. Without a through ticket she might have gone by another route.

"Not always are passengers of the congenial type. They are not telling their business to anybody, and a little sleuthing has to be done. Baggage is often the clue. When a passenger handing me a ticket from New York to Washington has his suit case marked Chicago or St. Paul, St. Louis or Dallas, it's a fair guess that that's where his home is. Then it's usually not difficult to suggest to him 'going west of Washington?' and to follow up as circumstances indicate. Sometimes I don't say a word, but just get hold of one of our folders on the National or Capitol Limited, and see that the passenger 'accidentally' finds it in his seat. Often that brings an inquiry and results in good revenue."

Sometimes a patron will ask the conductor to have a letter mailed. The address may be a tip that he's going further, and open the way to a courtesy inquiry. Request for a telegraph blank may lead to knowledge of a plan for further travel. Questions asked about points of interest in destination city usually indicate that the inquirer is a tourist, and a likely subject for solicitation.

"One of the most pleasant surprises that a conductor can have," Mr. Cole continued, "is to find that his sale of transportation to a single passenger results in bringing other people to the B. & O. Other conductors besides myself have had the experience of making a reservation for or selling transportation to a passenger beyond his immediate destination, and then finding that he is to meet some people and take them with him further. They may have planned to go over a competing road, but when they find that he has definitely chosen to use the B. & O., they go our way, too."

Track Supply Exhibit

Forty manufacturers of materials and supplies used in the construction and maintenance of tracks presented working exhibits of materials and equipment under the auspices of the Track Supply Association at the Hotel Stevens, Chicago, on September 17-19, in connection with the convention of the Roadmasters' and Maintenance of Way Association of America.

The officers of the Track Supply Association who were responsible for the preparation and conduct of this exhibit were: President, G. T. Willard, P. & M. Company, Chicago; vice-president, Frank J. Reagan, American Fork & Hoe Company, Chicago; secretary-treasurer, D. J. Higgins, Gardner-Denver Company, Chicago; directors, George E. Johnson, P. & M. Company, Chicago; Lem Adams, Oxweld Railroad Service Company, Chicago; H. H. Talboys, Nordberg Manufacturing Company, Milwaukee, Wis.; Lewis Thomas, Q & C Company, Chicago; and Jess Mossgrove, Austin-Western Road Machinery Company, Aurora, Ill.

This year the association decided to increase the number of officers and directors, and in the election Mr. Reagan was advanced to president; H. H. Talboys was elected first vice-president, and Jess Mossgrove, second vice-president; Mr. Higgins was re-elected secretary-treasurer; and the following were elected to the board of directors: For the two-year term, Lem Adams, Lewis Thomas and R. J. Platt, Sellers Manufacturing Company, Chicago. For one year, Earl E. Thulin, Duff-Norton Manufacturing Company, Chicago; R. J. McComb, Woodings-Verona Tool Works, Chicago; and K. K. Cavins, Fairmont Railway Motors, Inc., Chicago.

The list of exhibitors follows:

Air Reduction Sales Company, New York; welding and cutting equipment; oxygen and acetylene regulators; carbide lights, lamps and lanterns, welding rods, goggles, built-up and heat-treated rail joints; C. A. Daley, E. M. Sexton, B. N. Law, R. T. Peabody, J. F. Callahan, W. A. Andrews, Jr., W. H. Handrock, J. W. Kenefic, L. C. McDowell and M. M. Weist.

American Fork & Hoe Company, Cleveland, Ohio; rail anchors, tapered rail-joint shims, shovels, weed cutters, forks, rakes, scuffle hoes and broom rakes; Frank J. Reagan, G. L. Dunn, S. L. Henderson, C. E. Irwin, J. J. Nolan, F. C. Stowell, H. C. Branahl and T. A. Lawson.

Austin-Western Road Machinery Company, Aurora, Ill.; models and moving pictures, and literature on air dump cars; Jess Mossgrove, H. B. Bushnell, Bruce Smith and J. D. Benbow.

Barco Manufacturing Company, Chicago; gasoline tie tampers, stoves, sand dryers, and flexible ball joints; C. L. Mellor, C. O. Jenista and N. B. Robbins.

Buda Company, Harvey, Ill.; light section motor car, inspection motor car, mechanical tamper, switch stand, bonding drill, track liners, rail bender, track jacks; R. M. Blackburn, H. S. Brown, R. B. Fisher, G. A. Secor and H. C. Beebe.

Creepcheck Company, Inc., New York; rail anchors; T. D. Croweley and N. A. Howell.

Duff-Norton Manufacturing Company, Pittsburgh, Pa.; track jacks, power jacks, journal jacks, automatic lowering jacks and tie spacers; C. N. Thulin, E. E. Thulin, A. Roberts, G. C. Hutchinson, Jr., Dave Evans, J. J. Gilchrist and Thomas Baum.

Electric Tamper & Equipment Company, Ludington, Mich.; Universal tamper, ballasting and tamping blades and tips, and concrete vibrator; C. Jackson, H. W. Cutshall, V. G. Cartier and G. W. Walters.

Fairbanks, Morse & Co., Chicago; light section car, inspector's car, panel display of magneto, cam-ground piston with interior cooling ribs, connecting rod, air-cooled spark plug, one-piece crankshaft and Timken bearings, Timken axle-box roller bearing, steady bearing with ball joint in live rubber, and dual control carburetor; C. H. Wilson, E. C. Golladay, W. L. Nies, E. P. Chase, B. S. Spaulding and C. B. O'Neill.

Fairmont Railway Motors, Inc., Fairmont, Minn.; inspection car, section car and heavy-duty motor car; W. F. Kasper, W. D. Brooks, Kenneth K. Cavins, Arthur R. Fletcher, H. A. Sly, C. P. Benning, C. J. Dammann, J. E. Simkins, V. Pagett and C. H. Johnson.

Illinois Malleable Iron Company, Chicago; rail anchors, H. A. Morean, Chas. G. Ericson and W. T. Kelly.

Ingersoll-Rand Company, New York; pneumatic tie tamper, track wrench, rail drill, spike driver, rivet buster, riveting hammer, chipping hammer, holder on, air-line lubricator, safety saw, sump pump, wood borer, screw-spike wrench, clamp bolt wrench, impact wrench, grinders and scaling tool; Wm. H. Armstrong and G. W. Morrow.

O. F. Jordan Company, East Chicago, Ind.; model of spreader ditcher; H. M. McFarlane, J. C. Forbes and A. W. Banton.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.; one-man inspection car, motor-car engine, motor-car wheels, track gage and level; Frank E. McAllister, Ralph E. Keller, L. W. Bates and P. J. Robischung.

Lundie Engineering Corporation, New York; tie plates and rail lubricator; L. B. Armstrong and O. W. Youngquist.

Maintenance Equipment Company, Chicago; switch point protector, rail and flange lubricator, model of friction car stop and literature on rail layer and switch point protector; T. E. Rodman, D. M. Clarke and E. Overmier.

Mall Tool Co., Chicago; portable rail grinders and flexible-shaft cross-grinding and nut-setting equipment; A. W. Mall, F. A. McGonigle, M. Elrick and R. A. Gramer.

Morden Frog & Crossing Works, Chicago; heat-treated forged compromise joints, adjustable rail braces and miscellaneous forged fittings for switches; W. Homer Hartz, E. C. Argust, G. F. Killmer, Sam Withrow and L. I. Martin.

Nordberg Manufacturing Company, Milwaukee, Wis.; rail grinders, power jack, utility grinders and accessories; H. H. Talboys, W. W. Fitzpatrick and C. P. Clemmens.

Northwestern Motor Company, Eau Claire, Wis.; hump and extra gang car, section car and inspection motor car, motor car wheels, rail joint slotter, rail and frog surface grinder; F. W. Anderson, A. H. Nelson, Otis B. Duncan and W. J. Roehl.

Norton Company, Worcester, Mass.; grinding wheels, pictures of grinding machines in operation; W. E. Shumway, R. E. Taylor, W. N. Jove, I. W. Stanton and H. E. Walston.

Oxweld Railroad Service Company, Chicago; oxy-acetylene welding and cutting apparatus; L. C. Ryan, Lem Adams, W. H. Kofmehl, D. H. Pittman, J. R. Garrett, S. P. Donegan, F. J. Duffy, J. C. Stephenson and W. E. Donalds.

P & M Company, Chicago; rail anti-creepers and bond-wire protectors; D. T. Hallberg, G. T. Willard, W. A. Maxwell, J. E. Mahoney, G. E. Johnson, G. E. Webster, J. J. Gallagher and P. H. Hamilton.

Pettibone-Mulliken Company, Chicago; switch stands, switch point lock and mechanical switchman; G. J. Slibeck, J. B. Campbell, G. R. Lyman, C. Johnson and C. F. Landberg.

Pocket List of Railroad Officials, New York; copies of Pocket List of Railroad Officials; H. A. Brown and B. J. Wilson.

Positive Rail Anchor Company, Chicago; rail anchors and guard-rail plates and braces, adjustable rail braces; A. H. Told and L. C. Ferguson.

Power Ballaster Co., Chicago; moving pictures of track skeletonizer; F. H. Philbrick, Hobart Newman and H. Christy.

Q & C Company, New York; Guard rail clamp, switch point guard, tie plate and rail fastening, electric snow melter, compromise joint, derail, gaging tools, anti-slip rail tongs and gage rods; J. L. Ferry, L. E. Hassman and Lewis Thomas.

Rail Joint Company, New York; insulated and standard rail joints; E. A. Condit, Alex Chapman, C. B. Griffin, Harry C. Hickey, G. H. Larson, Thomas Ryan and R. W. Payne.

Railway Engineering and Maintenance, Chicago; copies of Railway Engineering and Maintenance and Railway age; Elmer T. Howson, F. C. Koch, W. S. Lacher, H. A. Morrison, J. G. Little, G. E. Boyd, H. E. McCandless, M. H. Dick and S. W. Hickey.

Railway Purchases & Stores, Chicago; copies of Railway Purchases and Stores; K. F. Sheeran and J. P. Murphy.

Railway Track-Work Company, Philadelphia, Pa.; portable electric track grinder, portable stock-rail grinder, rail-joint cross grinder, portable reciprocating grinder, portable flexible shaft grinder and grinding wheels; A. M. Nardini and Henry Perazzoli.

Ramapo Ajax Corporation, New York; full-size model highway crossing, switch points, switch stands, guard rail clamp, adjustable rail brace, limit gage, clips, sanitary water carrier, reversible manganese steel crossing and gage rods; J. B. Strong, T. E. Akers, J. E. Davidson, G. M. Cooper, G. A. Carlson, R. E. Einstein, D. Fairback, D. F. Hilton, P. Hoffman, J. S. Hutchins, A. F. Huber, W. Perdue and W. Bender.

S. E. Rawls Company, Streator, Ill.; railway track and right-of-way mowing equipment; S. E. Rawls, C. F. Butts and M. E. Rawls.

Republic Steel Corporation, Massillon, Ohio; curve guard rail, tie plates, lockers, filing cabinets, steel fence posts, wire, nails, staples, track spikes, track bolts and nuts, steel tubing, electric conduit; W. T. O'Neill, E. K. Conneely, C. F. Newpher, A. D. McAdam, R. C. Klemm, C. H. Aiken, H. C. Ellison, C. H. Ellison, N. A. Boerger, Kenneth Murray, C. J. Erdman, C. W. Ruth and W. B. Long.

Sellers Manufacturing Company, Chicago; wrought iron tie plates and angle bars; G. M. Hogan, R. J. Platt, R. A. Van Houten and J. T. Flynn.

Teleweld, Inc., Chicago; rail joint shims, samples of welded rails showing effects of pre-heating, samples of heat-treated rail and field hardness testing kit; A. M. Wood, C. R. Fohs and G. A. Green.

Templeton, Kenly & Co., Chicago; track and bridge jacks, G-Y tie spacer and rail puller expander; George L. Mayer, Chas. Neher, W. B. Templeton and R. B. Hill.

Toncan Culvert Manufacturers' Association, Youngstown, Ohio; corrugated culvert pipe; F. A. Kelly and R. W. Roof.

Woodings-Verona Tool Works, and Woodings Forge & Tool Company, Verona, Pa.; rail anchors, gaging tool, track levels and gages, spring-clip and bent-shoulder tie plates; R. J. McComb, W. H. Woodings and A. C. Laessig.

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Specialization —

CLANG! goes the bell . . . . the barrier drops and they're off! It is a test in which luck plays a very small part. The race is exciting . . . the flag waves for the last lap and the real strain sets in . . . . the horse first to cross the finish line in the gruelling race is the horse *sound of limb and flesh* which has the *reserve* strength not alone to meet this terrific strain successfully but to forge ahead in the face of it.

Strains proportionately as hard to bear up under are those imposed upon steam locomotives, which frequently have to haul more tonnage than they were designed for and yet maintain the same schedule. The boiler is forced and the superheater units take a "beating" internally and externally. If they are not *sound of material and construction,* they will not successfully meet this terrific strain and permit the train to maintain its schedule.

It is natural that after years of such service superheater units wear out. They then should be REmanufactured —usually when the locomotive goes in for firebox renewal. REmanufactured superheater units will "stand the gaff" of abnormal service—they are sound and full dimensioned both internally and externally.

To have unserviceable superheater units REmanufactured is to have them factory-rebuilt . . . . restored to a condition practically equal to new units, at about half the cost of new units. This can be done only by Elesco unit REmanufacturing service—a specialized service developed for the sole purpose of supplying the railroads with the best performance from superheater equipment. It is the result of specialization.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, Inc.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

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Canada: The Superheater Company, Limited, Montreal

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheater Pyrometers - American Throttles

Equipment and Supplies

LOCOMOTIVES

ROYAL STATE RAILWAYS OF SIAM.—Bids will be received by the stores superintendent, Royal State Railways, Bangkok, Siam, until 14 o'clock, January 2, 1936, for eight locomotives of the Mikado 2 type and two Garratt locomotives. Blank tender forms can be purchased from Messrs. Sandberg, 25 Broadway, New York City.

THE TEMISKAMING & NORTHERN ONTARIO has ordered from the Canadian Locomotive Company, Ltd., two locomotives of the 4-8-4 type for passenger service. These locomotives will have 22½-in. by 30-in. cylinders, 69-in. driving wheels, a boiler pressure of 275 lb., and an approximate weight in working order for the locomotive of 370,000 lb., and of the tender 272,000 lbs. They will have a maximum tractive force of 54,500 lb. The tender will have a capacity of 11,000 imperial gallons of water and 20 tons of fuel. The two locomotives are the first of this type to be bought by this road. They will be equipped with Nicholson thermic syphons, Elesco Type E superheaters, Elesco exhaust steam injectors, B.K. stokers, Franklin locomotive boosters on rear trailing axles and S.K.F. roller bearings on engine and trailing trucks and tender trucks. The locomotives are expected to be ready for delivery about March, 1936.

FREIGHT CARS

THE NORFOLK & WESTERN expects to build 500 all-steel hopper coal cars of 57½ tons' capacity in its Roanoke, Va., shops, commencing construction as soon as materials can be purchased and assembled.

IRON AND STEEL

THE NORFOLK & WESTERN is asking for bids on 10,000 tons of 131-lb. steel rail for early delivery.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC is inquiring for 175 tons of structural steel for a bridge at Madison, Wis.

THE MISSOURI PACIFIC has awarded a contract to the Mississippi Valley Structural Steel Co., St. Louis, Mo., for the fabrication of about 200 tons of structural steel for a bridge near Osawatomie, Kan.

MOTOR VEHICLES

THE CONNECTICUT COMPANY, affiliate of the New York, New Haven & Hartford, has accepted delivery of twelve 30-passenger street-car type buses from the American Car & Foundry Motors Company.

Supply Trade

S. C. Johnson, chemical engineer of the **Dearborn Chemical Company,** Chicago, has been appointed assistant to the vice-president.

The Miller Steel Company, Inc., Newark, N. J., has been appointed warehouse distributor of mechanical seamless steel tubing, for the **Globe Steel Tubes Company,** Milwaukee, Wis.

George H. Snyder, representative of the **American Steel Foundries,** Chicago, with headquarters at St. Paul, Minn., has been appointed sales agent to succeed **P. J. Kalman,** deceased.

The Rails Company, 50 Church street, New York, **L. T. Burwell,** president, has been appointed by the **Cleveland Tractor Company,** Cleveland, Ohio, representative of its Railroad Sales division.

A. E. Heroux, Detroit district manager of the paint division of **Aluminum Industries, Inc.,** has been promoted to general manager of the permite paint sales division, with headquarters at Cincinnati, Ohio, to succeed **A. B. Anderson,** resigned.

The Rawlplug Company, Inc., New York, has organized the **Rawlplug Dallas Company,** 1907 Canton street, Dallas, Tex., to handle the sales of the company's products in the northern section of Texas. **D. P. Fletcher** has been placed in charge of the new office.

Harold F. McCormick, a member of the board and head of the Finance committee of the **International Harvester Company,** has been elected chairman of the board, to succeed **Cyrus H. McCormick,** who has relinquished the position to devote more time to travel and recreation.

Stockholders of the **Inland Steel Company,** in a special meeting on September 20, approved the plan of reorganization to make effective the merger of **Joseph T. Ryerson & Son, Inc.,** with Inland. Ryerson stockholders already have approved the plan and only formalities remain to be completed.

R. P. Kilsby of the general sales office of the **Babcock & Wilcox Tube Company,** Beaver Falls, Pa., has been appointed manager of its western sales territory. Mr. Kilsby will have jurisdiction over all the districts covered by its offices located west of the Mississippi river and will have his headquarters at the company's Chicago office in the Marquette building.

Paul Weeks, manager of the Washington office of the **Caterpillar Tractor Company,** Peoria, Ill., has been appointed manager of the Special Sales division, to succeed **Walter H. Gardner,** who resigned October 1 to become general sales manager of the Keystone Steel & Wire Company, Peoria. **C. L. McMullen** has been placed in charge of engine sales to manufacturers, and **G. E. Spain** in charge of power unit sales to distributors and engine dealers.

The merger of the **Republic Steel Corporation** and the **Corrigan, McKinney Steel Company,** which was recently approved by the stockholders of both companies, has been completed and became effective on September 25. **Donald B. Gillies,** who has been president of the Corrigan, McKinney Steel Company, will be a vice-president and a director of the Republic Steel Company.

Carnegie-Illinois Steel Corporation

Following the unification of the Carnegie Steel Company and the Illinois Steel Company, subsidiaries of the United States

(:) McTett Studio
G. Cook Kimball

Steel Corporation, to form the Carnegie-Illinois Steel Corporation, with Benjamin F. Fairless as president, G. Cook Kimball, vice-president of the Illinois Steel Company, with headquarters at Chicago, has been appointed vice-president of the Carnegie-Illinois Steel Corporation, in charge of the Chicago district, and will take over the duties of George G. Thorp, who retires as president of the Illinois Steel Company under pension in accordance with his expressed wish. Mr. Kimball graduated from Harvard university in 1900, and in the following year entered

George G. Thorp

the steel industry in the engineering department of the American Tin Plate Company at Pittsburgh, Pa. In 1905, he was

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ALCO

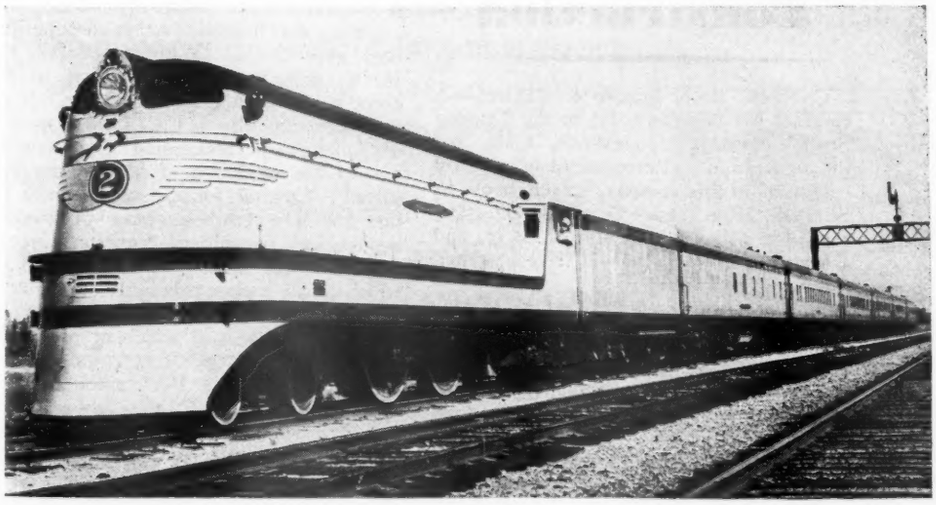
PERFORMANCE

The total number of paying passengers riding the "HIAWATHA" in August was 25,003 — 12,559 on the northbound trip and 12,444 southbound. This is an increase of 4,766 or 23.55% over the 20,237 carried in July, and an increase of 8,439 or 50.9% over the 16,564 carried in June.

On Saturday, August 31st, 912 passengers were carried northbound, and 720 southbound, the total for the day being 1,632 paying passengers.

During the first three months, and three days of its existence, 62,895 revenue paying passengers patronized the "HIAWATHA".

AMERICAN LOCOMOTIVE COMPANY



30 CHURCH STREET · NEW YORK · N.Y.

appointed chief engineer of the American Sheet & Tin Plate Company and held that position until 1931, when he was elected a vice-president of that company. In June, 1932, he was elected vice-president of the Illinois Steel Company, with headquarters at Chicago, which position he has held until his recent appointment.

Mr. Thorp was born at Pittsburgh, Pa., on June 29, 1869, and was graduated from the University of Wisconsin in 1891. He began his career as engineer of tests of the Illinois Steel Company at Chicago in 1892 and was appointed general superintendent of the Joliet, Ill., works in 1898. From 1901 to 1905, he constructed and operated the steel mills at Clairton, Pa., and in the latter year was elected vice-president of the Illinois Steel Company in charge of design, construction and operation of the steel mills at Gary, Ind. In June, 1932, he was elected president of the Illinois Steel Company, which position he has held until his retirement.

OBITUARY

George Slate Dies

George Slate, vice-president and a director of the Simmons-Boardman Publishing Company, and business manager of Marine Engineering & Shipping Age, and the Boiler Maker & Plate Fabricator, died on September 26, at Overlook Hospital, Summit, N. J., at the age of 61 years. Mr. Slate was born on September 27, 1874, at Oxford, Mich., and was educated in the public schools of Alma and Grand Rapids, Mich. He started his business career in the classified advertising department of

George Slate

the Philadelphia Press, later removing to New York, where he served with the New York Journal in a similar capacity. His association with Marine Engineering has extended over a period of about 34 years, he having joined the staff of that publication as an advertising salesman on October 14, 1901. He was later elected a vice-president of Aldrich Publishing Company, which at that time published that periodical. In 1905, the company acquired The Boiler Maker and Mr. Slate's jurisdiction was extended to include that journal as well as Marine Engineering. In 1920 the Aldrich Publishing Company, with its two publications, was acquired by the Simmons-Boardman Publishing Company and shortly thereafter Mr. Slate was elected a director of the latter company, on which board he has since served continuously. He was an associate member of The Society of Naval Architects and Marine Engineers and for 15 years served as secretary and treasurer of the Boiler Makers' Supply Men's Association and was long interested in the affairs of that organization and the Master Boiler Makers' Association. Mr. Slate also took an active part in the work of the Associated Business Papers, Inc., serving several years as a director, and in the business paper division of the Audit Bureau of Circulations.

William H. Sanford, for about 40 years with the American Car & Foundry Company and its predecessors, at Buffalo, N. Y., most of this time district manager at the Buffalo plant and later assistant vice-president of the American Car & Foundry Company, died on September 22 in Buffalo, at the age of 34 years.

TRADE PUBLICATIONS

ZEOLITES.—A 32-page bulletin has been issued by the Permutit Company, New York, which contains a comprehensive treatise on the present practice in the mining, processing, manufacture and use of zeolites. This treatise, which was prepared by Eskel Nordell of the technical department of the company, is said to be the first accurate and detailed paper on this subject that has been published.

POWER SELSYNS.—A four-page folder, issued by the General Electric Company, illustrates and describes the "Selsyn" self-synchronizing apparatus, whereby two motors remote from each other may be made to maintain a fixed speed ratio. The application of particular interest to the railways, namely, the operation of vertical-lift bridges by means of separate motors geared to the counterweight sheaves, is given a prominent place.

Construction

CHICAGO, ROCK ISLAND & PACIFIC.—A contract has been awarded to the Truscon Steel Company, Youngstown, Ohio, for the fabrication and erection of an all-steel extension to this company's fruit house at St. Paul, Minn., at a cost of $40,000. The extension will have a width of 68 ft., and a length of 264 ft., and will have insulated side walls and roof.

MISSOURI PACIFIC.—A contract has been awarded to Bilhorn, Bower & Peters, St. Louis, Mo., for the construction of the substructure for a new bridge near Osawatomie, Kan.

NORFOLK & WESTERN.—This road has given a contract to Haley, Chisholm & Morris, Charlottesville, Va., for work on an extension of its Buchanan branch from Grundy, Va. See item in the *Railway Age* of February 23, page 316.

Financial

CHESAPEAKE & OHIO.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized this company to assume liability for $9,000,000 of 3 per cent equipment trust of 1935 certificates to pay not more than 80 per cent of the cost of new cars and locomotives (estimated total cost, $11,259,720). The issue will mature in installments from 1936 to 1950 and was sold to the highest bidder at a price making the average interest cost to the company 2.845 per cent.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch line extending from Avoca, Ind., to Switz City, 33.8 miles.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Appointment of Trustees Postponed.*—On September 24 Federal Judge James H. Wilkerson announced that the hearing on the appointment of trustees for the Chicago, Milwaukee, St. Paul & Pacific would be continued until October 8. Judge Wilkerson questioned the constitutionality of a recent amendment to Section 77 of the federal bankruptcy act which requires the court to appoint trustees for railroads seeking reorganization under Section 77 and makes the appointments subject to ratification by the Interstate Commerce Commission.

CHICAGO, ROCK ISLAND & PACIFIC.—*Reorganization.*—At a hearing in the federal district court at Chicago on September 17, trustees of the Chicago, Rock Island & Pacific were given until February 27, 1936, to file a plan for reorganization. The hearing was a result of an application of the Reconstruction Finance Corporation asking that an order be issued obliging the railroad and its trustees to show cause why November 1 should not be made a definite date for the submission of a reorganization plan. Counsel for the government pointed out that in more than two years under the court's protection no plan has yet been submitted, while improvement in the road's business was awaited and instead further decline has been experienced. With its petition the R.F.C. submitted a request that in the event a plan is not filed soon, the injunction preventing the R.F.C. from disposing of collateral or proceeding as it saw fit toward the collection of its debt be dissolved. Counsel for the management of the line and representatives of various bondholders committees requested an extension of six months to February 27 in which to file a plan, arguing that a scheme of fixed charges cannot reasonably be drawn up for a road which at present is not even earning operating costs. Under an amendment to the Bankruptcy Act, approved on August 27, the debtor is required to file a plan of reorganization within six months of the entry of the order by the court approving the petition for release. Since this amendment succeeds the order entered by the court on August 6, requesting the line to show cause on September 17 why a plan for revamping

Continued on next left-hand page

A Return of 246 Per Cent

along with IMPROVED SERVICE

PREVIOUS to installing a "Union" Style S-1 Mechanical Facing Point Lock at a spring switch location on a Class I road, there was a 30-mile per hour speed restriction for eastbound passenger trains and 20 miles per hour for freight trains. Following the installation these speed restrictions were removed. During one month recently, 294 eastbound passenger and freight trains passed over this switch. Had these restrictions *not* been removed, 2.46 more tons of coal per day would have been consumed—a saving, at $1.75 per ton of coal, of $4.30 per day or at the rate of $1,569.50 per year —*approximately 246 per cent of the cost of installation!* And this saving covered the item of coal alone. Add to this the other savings effected and then ask yourself whether you can afford to be without the "Union" Style S-1 Mechanical Facing Point Lock at spring switch locations.

Our nearest district office will be glad to furnish details or discuss with you any proposed installation.

1009

1881 1935 **Union Switch & Signal Co.**

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

SWISSVALE · · · · · · · · · · PENNSYLVANIA

capital structure should not be submitted by November 1, the court withdrew its latter order, thereby dismissing the case and giving the railroad six months from August 27, or until February 27 in which to file its plan.

DELAWARE, LACKAWANNA & WESTERN. —*Trackage.*—This company has applied to the Interstate Commerce Commission for authority to extend its passenger train service from its present terminal at Northumberland, Pa., to Sunbury, 1.9 miles, by operating trains in each direction over the tracks of the Pennsylvania and entering into a trackage agreement with the Pennsylvania covering such operation and the use of the latter's station and railroad facilities at Sunbury. The plan has been approved by the Eastern Regional Coordinating Committee.

MISSOURI SOUTHERN.—*R. F. C. Loan.*—The Interstate Commerce Commission has authorized the extension for three years from October 7 of the time of payment of a loan of $99,200 by the Reconstruction Finance Corporation to this company. Authority has also been granted to extend to 1945 the maturity date of $125,000 of 6 per cent first mortgage bonds due August 15.

PACIFIC COAST. — *Abandonment.* — This company has applied to the Interstate Commerce Commission for authority to abandon part of its line from Los Alamos, Calif., to Los Olives, 12.01 miles.

SOUTHERN PACIFIC. — *Abandonment.* — This company has applied to the Interstate Commerce Commission for authority to abandon a portion of its West Side branch, from Cheshire, Ore., to Transfer, 11.09 miles.

WESTERN PACIFIC.—*Trustees Appointed.*—The following trustees were appointed by the federal district court at San Francisco, Cal., on September 23: Thomas M. Schumacher, chairman of the executive committee of the road; Charles Elsey, president; and Sidney M. Ehrman of San Francisco. A plan for reorganizing this road has already been submitted to the Interstate Commerce Commission under section 77 of the bankruptcy act. The appointment of Mr. Ehrman as an outside trustee to serve with the two management representatives was made in accordance with recent amendments to the bankruptcy act.

Average Prices of Stocks and Bonds

	Sept. 24	Last week	Last year
Average price of 20 representative railway stocks..	36.09	36.96	35.88
Average price of 20 representative railway bonds..	73.38	74.23	73.02

Dividends Declared

Cincinnati, Sandusky & Cleveland.—6 Per Cent Preferred, $1.63, semi-annually, payable October 15 to holders of record October 5.

Cleveland, Cincinnati & St. Louis.—6 Per Cent Preferred, $1.25, quarterly, payable October 31 to holders of record October 10.

Norfolk & Western.—Adjustment Preferred, $1.00, quarterly, payable November 19 to holders of record October 31.

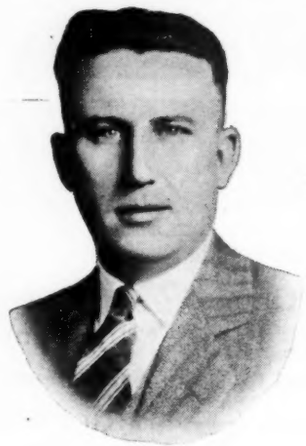
Southern-Mobile & Ohio.—Stock Trust Certificates, $2.00, payable October 1 to holders of record September 16.

Railway Officers

EXECUTIVE

J. M. Symes, chief of freight transportation of the Pennsylvania, has been elected vice-president in charge of operation and maintenance of the Association of American Railroads, at Washington, D. C., succeeding **James R. Downes,** effective October 1. Mr. Downes will return to the service of the Pennsylvania on October 1 as assistant to the president, after a leave of absence granted last November. A photograph of Mr. Downes and a biographical sketch of his railway career was published in the *Railway Age* of November 3, 1934, in connection with his election as vice-president for the Association of American Railroads.

Mr. Symes was born on July 8, 1895, at Glen Osborne, Pa., near Pittsburgh, and began work with the Pennsylvania in



J. M. Symes

May, 1916, in the office of the auditor of through freight traffic at Pittsburgh, transferring to the trainmaster's office of the Pittsburgh division in the same year. In May, 1920, he was assigned to the general superintendent's office at Cleveland, Ohio, and returned to Pittsburgh three years later as freight movement director in the office of the superintendent of freight transportation. Mr. Symes became chief clerk to the general manager at Chicago in May, 1927, and was promoted to superintendent of freight transportation in the same city a year later. In December, 1929, he was appointed superintendent of freight transportation at Philadelphia. Mr. Symes was appointed chief of freight transportation for the entire system in September, 1934.

PURCHASES AND STORES

Sam P. Warmack, division storekeeper on the Gulf Coast Lines (a unit of the Missouri Pacific Lines), with headquarters at Kingsville, Tex., has been promoted to general storekeeper of the Missouri Pacific Lines in Texas and Louisiana, succeeding the late **R. D. Crawford,** whose death on July 30 was noted in the *Railway Age* of August 3. **George W. Higdon,** storekeeper at Palestine, has been promoted to division storekeeper at Kingsville to succeed Mr. Warmack.

FINANCIAL, LEGAL AND ACCOUNTING

M. F. Stokes, secretary of the Chicago & Western Indiana and the Belt Railway, Chicago, has been elected also treasurer to succeed **J. E. Murphy,** assigned to other duties.

OPERATING

H. C. Miller, traffic agent in the Ohio Valley department of the Railway Express Agency, has been appointed superintendent of the Central Illinois division, with headquarters at Chicago, Ill., succeeding **John Hines,** retired. This appointment became effective August 1. **Joseph R. Kastner,** assistant superintendent terminal service at Chicago, has been appointed superintendent terminal service at Chicago, succeeding **H. H. Hammon,** retired.

George C. Jefferis, assistant superintendent of the Middle division of the Atchison, Topeka & Santa Fe, who has been promoted to superintendent of the Slaton division, with headquarters at Slaton, Tex., as noted in the *Railway Age* of September 14, was born on September 27, 1889, at Philadelphia, Pa. He entered railway service on June 4, 1903, as a telegraph operator on the Pennsylvania. After eight years with this company Mr. Jefferis went with the Santa Fe as a chainman at Amarillo, Tex., and served successively in this position and as a rodman, transitman, draftsman, assistant extra gang foreman, and extra gang foreman at various points in Texas and New Mexico until August, 1916. In that month he was promoted to roadmaster, with headquarters at Plainview, Tex., and in the following year he was further advanced to division engineer, with headquarters at Clovis, N. M. In February, 1924, Mr. Jefferis was advanced to assistant superintendent of the Middle division, with headquarters at Newton, Kan., which position he continued to hold until his recent promotion to superintendent.

Effective September 1 the positions of superintendent of the Eastern division of the Minneapolis & St. Louis, with headquarters at Oskaloosa, Iowa, and of superintendent of the Central and Western divisions, with headquarters at Minneapolis, Minn., were abolished. The Eastern, Western and Central divisions are to retain their identities and will be operated as distinct units under the direction of a general superintendent, with headquarters at Minneapolis. **R. E. Ryan,** superintendent of the Central and Western divisions, has been appointed general superintendent, and **Frederick O. Coleman,** superintendent of the Eastern division, has been appointed assistant general superintendent, with headquarters also at Minneapolis. **A. A. Fox** has been appointed to the newly-created position of assistant superintendent of the Eastern division, with

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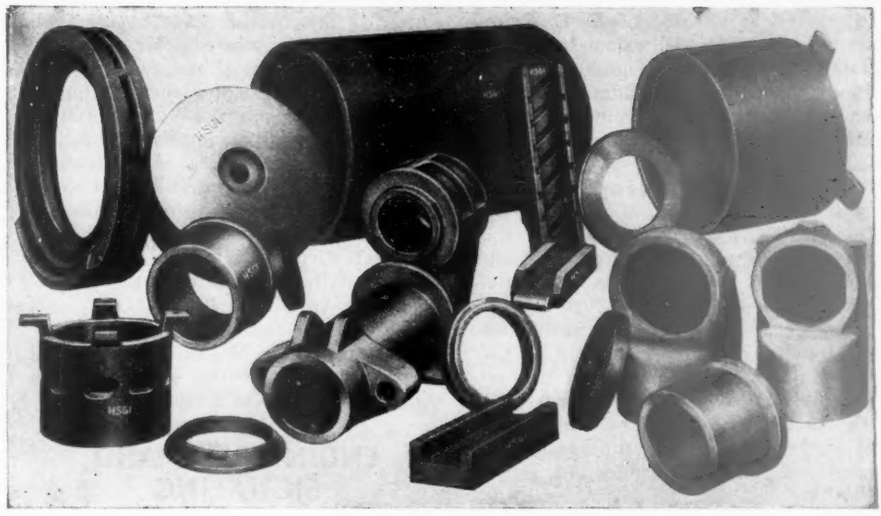

VITAL PARTS

Should Be Made From Dependable Wear-Resisting Material

HUNT-SPILLER *Air Furnace* GUN IRON is the choice of most leading railroads for those vital locomotive parts subjected to great frictional wear and high superheat temperatures.

It is obvious that the service rendered and economies effected must be of unusual nature.

Dependable service in spite of the constant increase in temperatures and frictional wear has convinced the railroads that the use of HUNT-SPILLER *Air Furnace* GUN IRON parts is an economic necessity.

Complete installations insure maximum economies.

HSGI
Reg. U. S. Trade Mark
Cylinder Bushings
Cylinder Packing Rings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings

Parts Finished For Application

Dunbar Sectional Type Packing
Duplex Sectional Type Packing for Cylinders and Valves
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

HUNT-SPILLER MFG. CORPORATION
J. G. Platt, Pres. & Gen. Mgr. V. W. Ellet, Vice-President

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International Rwy. Supply Co., 30 Church Street, New York, N. Y.

HUNT-SPILLER *Air Furnace* GUN IRON

headquarters at Oskaloosa. **E. L. Crimmen** has been appointed trainmaster of the Western division, with headquarters at Minneapolis, and **M. K. Edmundson** has been appointed assistant trainmaster with headquarters at Bartlett, Ill.

Mr. Coleman was born on February 8, 1884, at Eau Claire, Wis., and entered railway service with the M. & St. L. on October 1, 1901, as a brakeman. He was made a conductor in September, 1912, and was promoted to trainmaster at Watertown, S. D., in September, 1917. Three years later Mr. Coleman was further advanced to assistant superintendent at Oskaloosa and after six months in this capacity he was promoted to superintendent, with the same headquarters, which position he held until his recent appointment as assistant general superintendent.

TRAFFIC

F. A. Adams, assistant freight traffic manager of the Chicago, Rock Island & Pacific with headquarters at Chicago, has been transferred to Los Angeles, Cal., to fill a newly-created position. **R. C. Davidson,** general freight agent at Chicago, has been promoted to assistant freight traffic manager at the same point, to succeed Mr. Adams. **E. Rigg,** assistant general freight agent, has been appointed general freight agent in charge of rate adjustments East of the Missouri River, succeeding Mr. Davidson, and **E. Tharp** has been appointed assistant general freight agent in charge of interstate commerce matters to replace Mr. Rigg.

John C. Rill, general manager of the western region of the Pennsylvania at Chicago, has been appointed chief of freight transportation, succeeding **J. M. Symes.** Mr. Rill was born on March 31, 1889, at Hampstead, Md., and entered the service of the Pennsylvania in May, 1910, as a clerk at Bowie, Md., being promoted to chief clerk to the assistant trainmaster at Perryville, Md., in January, 1911. About

John C. Rill

three years later, Mr. Rill was advanced to assistant yardmaster at Chester, Pa., being promoted to yardmaster in that city in July, 1915. He was further promoted to assistant trainmaster of the Maryland division in May, 1917, which position he held until October of that year when he entered military service in the Engineer Corps of the United States Army. On returning to railway service, Mr. Rill again assumed the position of assistant trainmaster on the Maryland division at Wilmington, Del., being promoted to superintendent of the Logansport division at Logansport, Ind., in April, 1927. He was transferred to the Columbus division at Columbus, Ohio, in May, 1928, being again transferred a year later to the Philadelphia Terminal division at Philadelphia. In January, 1931, he was promoted to general superintendent of the Eastern Ohio division, with headquarters at Pittsburgh. In November, 1931, Mr. Rill was appointed general manager of the western region, with headquarters at Chicago.

ENGINEERING AND SIGNALING

T. J. Skillman, chief engineer of the Pennsylvania system, with headquarters at Philadelphia, Pa., has been granted a leave of absence on account of ill health, and **W. D. Wiggins,** chief engineer of the Central region at Pittsburgh, has been appointed acting chief engineer of the Pennsylvania Railroad, effective October 1. **William B. Wood,** engineer in charge of the tunnel improvements undertaken by the Pennsylvania at Baltimore, in connection with the New York-Washington electrification, has been appointed acting chief engineer at Pittsburgh, also effective October 1.

OBITUARY

Mark M. Eidson, assistant superintendent of transportation for the Wabash at St. Louis, died at his home at that point on September 16.

M. M. Moffitt, supervisor of sales and salvage of the Southern Pacific, with headquarters at San Francisco, Cal., and formerly assistant purchasing agent of this company, died on September 14.

A. P. Wenzell, a special engineer on the New York Central, with headquarters at Chicago, died at his home in that city on September 22. Mr. Wenzell had been engaged in special assignments out of the vice-president's office and had made a study of the railroad terminal problem at Chicago. He had also served for several years as secretary of the Special Committee on Engineering Research, Inland Waterways and Intercoastal Canals of the American Railway Association.

C. C. Kyle, purchasing agent of the Northern Pacific, with headquarters at St. Paul, Minn., died on September 22, in a hospital at Tacoma, Wash. Mr. Kyle had been connected with the Northern Pacific continuously for 43 years. He entered the service of this company in 1892 as a stenographer at Brainerd, Minn., and was later promoted to chief clerk at the same point. In 1904, Mr. Kyle was transferred to St. Paul, Minn., where he was promoted to superintendent of the general office building in 1916. In 1921 he was appointed acting general storekeeper, with the same headquarters, being appointed general storekeeper in the following year. In October, 1926, Mr. Kyle was advanced to purchasing agent, which position he was holding at the time of his death. Mr. Kyle was a past president

C. C. Kyle

of the Purchases and Stores division, American Railway Association, having held this position in 1929.

George E. Patterson, manager of personnel of the Illinois Central, and formerly vice-president in charge of operations of this road, whose death on September 18 was noted in the *Railway Age* of September 21, had been connected with this company for 46 years. He was born on June 23, 1869, in Mason County, Ill., and entered railway service with the Illinois Central on May 8, 1889, serving successively as agent and telegraph operator until 1903, when he was made a division agent. In 1904, Mr. Patterson was appointed inspector of weights and in the following year he was promoted to trainmaster. After holding the latter position for eight years, he was further promoted to superintendent of the Springfield division, subsequently being transferred to

G. E. Patterson

the Louisiana division, and thence to the Illinois division. In July, 1920, Mr. Patterson was appointed acting general superintendent of the Northern Lines, with headquarters at Chicago, being appointed general superintendent of these lines three years later. In November, 1924, he was advanced to general manager of the system, with the same headquarters, and five years later he was made vice-president in charge of operations. He held the latter position until early in 1934, when he became manager of personnel.

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from 145 Monthly Reports of Revenues and Expenses Representing 149 Class I Steam Railways

FOR THE MONTH OF JULY, 1935 AND 1934

Item	United States		Eastern District		Southern District		Western District	
	1935	1934	1935	1934	1935	1934	1935	1934
Average number of miles operated	237,700	239,002	58,955	59,078	45,244	45,413	133,501	134,511
Revenues:								
Freight	$220,490,347	$221,291,851	$91,145,828	$90,358,650	$41,601,739	$40,744,324	$87,742,780	$90,188,877
Passenger	31,603,792	32,211,560	17,865,034	19,126,121	3,405,760	3,553,056	10,332,998	9,532,383
Mail	7,339,598	7,178,685	2,790,901	2,745,882	1,345,658	1,269,034	3,203,039	3,163,769
Express	2,741,997	2,273,501	1,025,203	818,892	401,256	345,077	1,315,538	1,109,532
All other transportation	6,583,421	6,324,557	3,376,255	3,283,244	555,096	505,669	2,652,070	2,535,644
Incidental	5,935,016	6,104,800	3,005,757	3,131,820	716,677	772,625	2,212,582	2,200,355
Joint facility—Cr.	851,633	833,857	239,003	233,960	215,227	223,667	397,403	376,230
Joint facility—Dr.	196,689	208,907	45,279	53,334	19,095	19,464	132,315	136,109
Railway operating revenues	275,349,115	276,009,904	119,402,702	119,645,235	48,222,318	47,393,988	107,724,095	108,970,681
Expenses:								
Maintenance of way and structures	38,028,346	34,356,187	14,253,109	13,738,769	6,176,474	6,155,435	17,598,763	14,461,983
Maintenance of equipment*	55,794,148	53,916,824	23,689,538	23,775,874	10,578,713	10,286,077	21,525,897	19,854,873
Traffic	8,164,355	7,794,858	3,104,129	2,976,136	1,498,937	1,463,688	3,561,289	3,355,034
Transportation	102,038,969	97,896,996	46,390,593	45,084,143	16,629,095	15,895,674	39,019,281	36,917,179
Miscellaneous operations	2,472,199	2,404,863	1,049,749	1,111,172	245,531	226,791	1,176,919	1,066,900
General	11,795,498	12,516,637	5,353,260	5,501,888	2,026,536	2,144,466	4,415,702	4,870,283
Transportation for investment—Cr.	362,817	393,480	75,719	169,534	27,225	39,329	259,873	184,617
Railway operating expenses	217,930,698	208,492,885	93,764,659	92,018,448	37,128,061	36,132,802	87,037,978	80,341,635
Net revenue from railway operations	57,418,417	67,517,019	25,638,043	27,626,787	11,094,257	11,261,186	20,686,117	28,629,046
Railway tax accruals	20,035,452	21,080,588	8,407,786	8,830,232	3,903,162	3,914,763	7,724,504	8,335,593
Uncollectible railway revenues	105,365	88,604	57,764	44,716	7,715	12,629	39,886	31,259
Railway operating income	37,277,600	46,347,827	17,172,493	18,751,839	7,183,380	7,333,794	12,921,727	20,262,194
Equipment rents—Dr. balance	7,434,009	7,852,467	3,564,058	3,816,018	238,829	418,329	3,631,122	3,618,120
Joint facility rent—Dr. balance	2,992,194	3,054,096	1,625,126	1,663,926	375,156	389,032	991,912	1,001,138
Net railway operating income (*a*)	26,851,397	35,441,264	11,983,309	13,271,985	6,569,395	6,526,433	8,298,693	15,642,936
Ratio of expenses to revenues (per cent)	79.15	75.54	78.53	76.91	76.99	76.24	80.80	73.73
* Includes:								
Depreciation	16,155,508	15,441,586	7,125,475	6,802,349	3,132,353	2,923,140	5,897,680	5,716,097
Retirements	193,361	347,302	69,175	60,653	47,749	140,629	76,437	146,020
Maintenance of equipment before depreciation and retirements	39,445,279	38,127,936	16,494,888	16,912,872	7,398,611	7,222,308	15,551,780	13,992,756
Net railway operating income before depreciation and retirements	43,200,266	51,230,152	19,177,959	20,134,897	9,749,497	9,590,202	14,272,810	21,505,053

FOR SEVEN MONTHS ENDED WITH JULY, 1935 AND 1934

Average number of miles operated	237,937	239,185	58,980	59,103	45,254	45,446	133,703	134,636
Revenues:								
Freight	$1,537,610,354	$1,541,363,242	$677,718,367	$677,376,947	$307,817,259	$308,768,206	$552,074,728	$555,218,089
Passenger	202,401,574	197,402,574	118,190,435	118,985,475	27,261,964	25,978,423	56,949,175	52,438,676
Mail	52,414,353	52,176,560	20,098,855	20,243,202	9,356,181	9,193,079	22,959,317	22,740,279
Express	30,973,019	31,220,452	11,704,461	12,838,831	7,147,389	6,789,494	12,121,169	11,592,127
All other transportation	45,029,055	43,349,592	23,136,476	22,901,611	4,426,056	4,057,020	17,466,523	16,390,961
Incidental	38,357,419	36,486,062	20,371,660	19,838,012	5,849,008	5,418,668	12,136,751	11,229,382
Joint facility—Cr.	5,602,256	5,252,420	1,725,975	1,631,652	1,300,900	1,239,039	2,575,381	2,381,729
Joint facility—Dr.	1,444,596	1,343,897	389,081	356,589	121,359	114,050	934,156	873,258
Railway operating revenues	1,910,943,434	1,905,907,005	872,557,148	873,459,141	363,037,398	361,329,879	675,348,888	671,117,985
Expenses:								
Maintenance of way and structures	221,533,695	213,962,723	84,709,492	86,044,349	42,992,585	41,587,901	93,831,618	86,330,473
Maintenance of equipment†	389,237,766	382,074,626	173,106,937	174,711,254	74,092,633	71,943,453	142,038,196	135,419,919
Traffic	55,156,700	51,954,789	20,658,488	19,594,099	10,572,834	9,895,747	23,925,378	22,464,943
Transportation	714,219,940	673,307,635	331,470,334	320,119,258	120,824,421	113,042,151	261,925,185	240,146,226
Miscellaneous operations	17,174,001	15,285,736	7,955,874	7,537,109	2,214,163	1,885,326	7,003,964	5,863,301
General	81,823,569	85,785,362	38,084,279	37,713,261	14,555,301	14,587,986	29,183,989	33,484,115
Transportation for investment—Cr.	1,752,305	1,590,923	394,807	481,115	229,877	179,530	1,127,621	930,278
Railway operating expenses	1,477,393,366	1,420,779,948	655,590,597	645,238,215	265,022,060	252,763,034	556,780,709	522,778,699
Net revenue from railway operations	433,550,068	485,127,057	216,966,551	228,220,926	98,015,338	108,566,845	118,568,179	148,339,286
Railway tax accruals	142,073,012	147,832,345	58,935,223	61,022,584	29,422,284	29,574,924	53,715,505	57,234,837
Uncollectible railway revenues	578,413	677,563	249,541	359,133	76,467	108,477	252,405	209,953
Railway operating income	290,898,643	336,617,149	157,781,787	166,839,209	68,516,587	78,883,444	64,600,269	90,894,496
Equipment rents—Dr. balance	48,325,137	53,150,573	23,646,519	26,625,384	3,074,543	4,451,585	21,604,075	22,073,604
Joint facility rent—Dr. balance	20,909,452	21,158,287	11,821,928	11,656,212	2,210,904	2,616,082	6,876,620	6,885,993
Net railway operating income (*b*)	221,664,054	262,308,289	122,313,340	128,557,613	63,231,140	71,815,777	36,119,574	61,934,899
Ratio of expenses to revenues (per cent)	77.31	74.55	75.13	73.87	73.00	69.95	82.44	77.90
† Includes:								
Depreciation	111,864,636	108,529,912	48,834,429	47,777,356	21,715,502	20,531,800	41,314,705	40,220,756
Retirements	939,025	2,573,469	354,507	747,945	238,080	858,083	346,438	967,441
Maintenance of equipment before depreciation and retirements	276,434,105	270,971,245	123,918,001	126,185,953	52,139,051	50,553,570	100,377,053	94,231,722
Net railway operating income before depreciation and retirements	334,467,715	373,411,670	171,502,276	177,082,914	85,184,722	93,205,660	77,780,717	103,123,096

a The July, 1935, income as reported was increased by credits to operating expenses on account of reversal of charges previously made for liability under the Railroad Retirement Act. These credits amounted to $941,039.

b Income for the 7 months ended with July, 1935, as reported was increased by credits to operating expenses on account of reversal of charges previously made for liability under the Railroad Retirement Act. The net credit was $6,546,952.

Compiled by Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Table of Operating Statistics of Railways begins on next left-hand page

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of July,

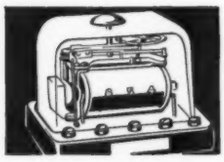
Region, road, and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross Excluding locomotives and tenders	Ton-miles (thousands): Net Revenue and non-revenue	Average number of locomotives on line: Serviceable	Average number of locomotives on line: Unserviceable	Average number of locomotives on line: Per cent unserviceable	Average number of locomotives on line: Stored
New England Region:												
Boston & Albany....1935	373	113,818	118,097	7,754	2,735	66.2	143,932	46,724	59	37	38.3	16
1934	402	115,651	119,717	7,960	2,847	66.4	150,163	49,379	62	38	37.9	16
Boston & Maine....1935	1,971	240,135	264,930	23,951	8,068	71.1	416,256	155,380	102	124	54.9	7
1934	2,016	245,702	273,097	26,041	8,044	68.0	435,735	158,889	121	152	55.7	17
N. Y., New Hav. & Hartf..1935	2,050	332,051	404,434	19,810	10,384	65.2	566,338	202,798	188	112	37.4	11
1934	2,049	333,377	406,155	19,204	10,254	64.1	561,360	199,532	202	149	42.5	16
Great Lakes Region:												
Delaware & Hudson....1935	835	183,942	240,327	25,175	5,745	64.2	347,639	156,919	240	30	11.3	161
1934	848	189,675	244,459	24,240	5,817	60.3	361,241	156,782	243	30	11.2	154
Del., Lack. & Western....1935	992	279,789	311,356	40,688	8,658	66.0	495,152	186,220	149	87	37.0	44
1934	992	334,374	366,787	42,659	9,841	63.9	570,543	208,230	178	78	30.5	51
Erie (incl. Chi. & Erie)....1935	2,305	622,318	651,886	39,234	25,187	64.8	1,529,303	560,577	280	193	40.8	67
1934	2,315	643,275	669,758	50,932	26,264	60.8	1,642,590	574,130	315	176	35.8	80
Grand Trunk Western....1935	1,007	223,338	225,233	1,962	6,068	61.7	362,026	118,828	70	71	50.0	..
1934	1,007	206,500	208,331	2,670	5,329	59.5	325,628	106,886	69	77	52.7	..
Lehigh Valley 1935	1,335	311,374	329,576	35,066	9,815	65.0	603,411	238,480	152	160	51.4	8
1934	1,335	369,046	386,350	35,603	10,612	62.8	653,527	248,497	181	131	41.9	21
New York Central....1935	10,919	2,219,121	2,322,219	127,235	70,876	60.8	4,411,036	1,739,560	876	637	42.1	187
1934	10,941	2,244,374	2,341,105	129,689	73,021	59.8	4,627,107	1,844,990	899	677	43.0	156
N. Y., Chi. & St. Louis....1935	1,661	397,802	400,167	4,790	12,782	63.0	755,142	263,407	132	44	24.8	45
1934	1,661	456,150	461,370	4,189	14,010	60.0	854,197	298,323	127	42	24.9	25
Pere Marquette 1935	2,096	292,957	303,427	3,720	6,805	61.1	430,889	165,260	110	45	28.8	8
1934	2,108	307,010	314,039	2,682	7,088	58.5	448,848	162,347	108	39	26.5	13
Pittsburgh & Lake Erie....1935	234	63,944	65,123	26	2,493	57.8	217,042	120,817	32	40	55.2	9
1934	234	61,865	63,106	16	2,450	59.5	206,339	115,690	30	42	58.4	8
Wabash 1935	2,435	494,293	502,692	10,811	14,744	63.1	854,250	276,838	161	163	50.3	39
1934	2,445	519,489	526,781	10,813	14,989	60.4	880,007	288,162	159	177	52.6	46
Central Eastern Region:												
Baltimore & Ohio....1935	6,319	1,202,821	1,444,684	142,709	34,247	62.3	2,250,257	958,406	715	604	45.8	140
1934	6,263	1,298,739	1,547,545	165,421	36,886	59.4	2,543,070	1,107,937	781	542	41.0	160
Central of New Jersey....1935	684	132,143	147,528	25,023	4,006	59.6	271,040	123,988	66	90	57.5	13
1934	690	127,615	143,531	24,831	4,088	57.0	287,183	131,723	78	94	54.4	24
Chicago & Eastern Illinois..1935	939	151,176	152,202	2,326	3,112	67.6	182,519	74,510	47	62	56.9	6
1934	939	162,994	162,994	2,612	3,371	62.6	210,304	84,604	53	56	51.5	10
Elgin, Joliet & Eastern....1935	434	80,111	80,611	473	1,825	62.6	136,445	66,972	53	33	38.0	2
1934	446	73,432	74,798	492	1,497	56.9	117,209	54,772	62	27	30.6	12
Long Island 1935	393	27,267	27,940	13,798	224	53.6	16,627	6,308	31	21	40.7	2
1934	396	24,638	25,576	12,751	245	53.5	18,278	7,141	29	26	47.5	..
Pennsylvania System 1935	10,009	2,474,865	2,789,990	281,892	85,537	62.8	5,614,976	2,401,174	1,368	1,097	44.5	266
1934	10,018	2,571,039	2,846,298	307,330	86,522	60.8	5,870,059	2,526,670	1,475	933	38.7	326
Reading 1935	1,452	333,894	358,650	38,602	8,812	60.6	623,565	282,057	264	104	28.2	91
1934	1,454	354,282	384,252	41,445	9,583	58.0	687,179	313,681	269	103	27.7	95
Pocahontas Region:												
Chesapeake & Ohio....1935	3,050	710,934	739,047	27,223	28,656	55.3	2,385,732	1,258,641	398	107	21.2	112
1934	3,076	796,595	834,242	30,672	32,967	54.3	2,836,940	1,503,407	436	106	19.6	115
Norfolk & Western....1935	2,145	538,616	558,576	22,430	20,555	59.1	1,657,882	854,913	330	52	13.7	119
1934	2,162	568,312	590,341	23,425	21,721	58.5	1,759,466	879,241	386	41	9.6	149
Southern Region:												
Atlantic Coast Line....1935	5,148	478,700	479,189	6,566	8,518	62.3	458,133	157,128	302	122	28.8	57
1934	5,145	493,831	495,818	6,184	8,492	60.3	465,255	155,749	316	128	28.7	84
Central of Georgia....1935	1,886	236,475	237,421	4,059	4,837	66.3	264,230	92,869	99	42	30.0	..
1934	1,886	234,444	235,774	4,174	4,768	64.8	264,501	92,299	102	38	27.1	..
Illinois Central (incl. Y. & M. V.)....1935	6,587	1,318,835	1,326,798	24,494	30,220	63.0	1,866,348	733,851	621	251	28.8	29
1934	6,617	1,346,195	1,360,271	25,551	29,441	58.3	1,925,044	732,419	570	333	36.9	30
Louisville & Nashville....1935	5,046	863,435	925,499	21,221	18,680	59.9	1,269,933	584,003	301	279	48.2	26
1934	5,060	891,641	956,760	18,769	18,601	57.3	1,279,256	569,907	317	298	48.5	21
Seaboard Air Line....1935	4,295	415,454	418,959	1,883	8,551	65.5	474,642	165,146	173	109	38.6	18
1934	4,296	439,397	446,581	3,329	9,146	61.8	533,659	189,115	192	88	31.4	22
Southern 1935	6,599	1,124,229	1,137,034	18,704	24,529	65.7	1,324,525	477,663	533	278	34.3	54
1934	6,599	1,084,628	1,098,582	17,639	23,176	64.4	1,259,777	444,065	619	287	31.7	109
Northwestern Region:												
Chi. & North Western....1935	8,428	869,482	917,506	23,782	22,323	64.9	1,328,644	457,622	525	232	30.6	99
1934	8,443	933,600	998,535	23,325	24,871	61.2	1,499,608	522,327	584	228	28.0	164
Chicago Great Western....1935	1,458	209,634	209,850	7,483	5,936	62.1	357,306	126,276	61	34	36.2	6
1934	1,463	225,192	225,607	13,785	6,688	59.0	410,912	136,944	60	37	38.2	2
Chi., Milw., St. P. & Pac..1935	11,119	1,158,943	1,220,798	53,972	29,726	62.1	1,827,390	706,160	480	174	26.6	104
1934	11,154	1,249,974	1,329,868	63,378	33,126	59.6	2,045,953	762,364	536	352	39.6	160
Chi., St. P., Minneap. & Om..1935	1,641	190,627	196,386	8,666	3,956	66.7	234,633	95,905	102	39	28.0	39
1934	1,653	212,517	223,835	10,423	4,394	63.6	263,812	105,747	119	37	23.9	54
Great Northern 1935	8,254	692,023	696,611	17,891	22,483	60.9	1,516,614	673,659	418	180	30.2	83
1934	8,302	758,744	763,905	20,879	23,423	60.5	1,510,452	637,906	427	164	27.7	91
Minneap., St. P. & S. St. M..1935	4,274	348,734	353,031	2,677	7,815	66.8	443,298	185,956	115	32	22.0	..
1934	4,280	349,714	356,564	3,211	7,691	60.1	441,371	163,618	119	38	24.5	2
Northern Pacific 1935	6,416	601,514	660,559	43,982	17,239	66.8	1,023,379	391,302	329	118	26.4	9
1934	6,410	689,226	749,309	45,485	19,444	62.7	1,178,203	443,219	361	156	30.1	24
Oreg.-Wash. R. R. & Nav..1935	2,097	161,748	170,316	11,421	4,017	67.9	229,863	87,111	85	40	31.9	17
1934	2,148	151,810	158,036	9,972	3,550	68.7	197,374	74,517	83	40	32.8	18
Central Western Region:												
Alton 1935	921	192,892	203,413	1,459	4,080	57.7	270,896	94,995	54	41	43.3	..
1934	921	204,119	216,567	1,749	4,289	58.6	281,851	98,438	52	44	45.8	..
Atch., Top. & S. Fe (incl. G.C. & S.F. & P. & S.F.).1935	13,260	1,691,718	1,770,345	66,139	45,545	61.8	2,837,880	901,622	638	366	36.5	132
1934	13,316	1,691,163	1,773,439	69,704	47,401	59.8	3,013,382	971,917	663	354	34.8	140
Chi., Burl. & Quincy....1935	8,971	1,102,134	1,152,317	40,274	26,385	62.4	1,553,448	644,121	440	98	18.2	9
1934	9,096	1,171,944	1,220,499	38,780	29,503	59.5	1,757,820	693,270	451	116	20.5	7
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1935	8,297	1,023,402	1,047,156	6,179	22,501	62.0	1,359,125	483,761	367	268	42.2	20
1934	8,316	1,052,860	1,070,319	8,961	23,415	61.4	1,421,679	526,197	442	146	24.9	98
Denv. & Rio Gr. Western..1935	2,584	221,191	239,597	23,945	5,727	67.9	339,507	139,939	163	47	22.4	17
1934	2,636	230,047	249,309	26,279	6,025	62.5	368,156	133,394	162	51	23.9	19
Los Angeles & Salt Lake...1935	1,225	150,680	172,083	23,847	4,590	69.1	258,450	95,678	72	18	20.4	7
1934	1,232	166,087	193,429	30,397	4,691	63.4	292,610	113,985	71	23	24.2	6
Oregon Short Line....1935	2,485	269,642	277,146	13,385	6,436	60.2	387,770	134,428	116	56	32.5	25
1934	2,468	234,231	246,088	15,844	5,933	63.9	348,199	124,882	126	54	30.1	37
Southern Pac.—Pac. Lines..1935	8,599	1,210,686	1,307,010	136,369	38,857	58.3	2,541,563	771,803	523	258	33.0	121
1934	8,607	1,310,684	1,421,661	159,077	41,047	59.1	2,647,132	854,702	561	289	33.9	112
Union Pacific 1935	3,590	865,858	887,466	41,422	29,906	60.9	1,842,867	622,595	268	130	32.7	60
1934	3,768	918,693	942,523	42,555	29,566	55.1	1,922,409	575,090	302	125	29.2	70
Southwestern Region:												
Mo.-Kans.-Texas Lines 1935	3,282	357,646	361,063	4,874	9,531	62.9	565,444	196,699	105	89	46.0	21
1934	3,282	362,748	365,066	4,185	9,468	60.8	570,111	195,232	141	74	34.5	57
Missouri Pacific 1935	7,202	1,020,215	1,048,220	20,843	27,311	64.6	1,637,406	618,915	381	149	28.1	127
1934	7,330	1,112,345	1,145,735	25,952	29,341	58.8	1,845,509	664,977	422	135	24.3	147
St. Louis-San Francisco....1935	4,993	635,732	643,978	7,766	13,391	64.4	803,038	322,941	367	75	17.0	115
1934	5,060	644,436	649,721	7,903	13,863	59.6	856,719	321,408	394	83	17.4	143
St. Louis Southw. Lines....1935	1,774	240,923	242,416	3,128	6,084	58.5	373,358	116,014	90	28	24.0	14
1934	1,798	209,494	213,787	2,843	5,006	62.5	290,024	98,259	90	36	28.6	7
Texas & New Orleans....1935	4,420	504,353	504,371	8,885	10,946	56.5	710,105	223,119	224	70	23.9	53
1934	4,433	478,489	478,585	3,928	10,555	59.5	655,485	228,395	234	68	22.5	62
Texas & Pacific....1935	1,945	271,924	271,924	2,591	8,262	66.3	484,739	164,591	150	73	32.6	72
1934	1,946	254,012	254,012	2,599	7,773	63.6	463,823	152,640	156	78	33.3	88

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

1935, Compared with July, 1934, for Roads with Annual Operating Revenues Above $25,000,000

Region, road, and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:													
Boston & Albany....1935	2,782	4,335	7,117	24.5	21,333	1,265	411	17.1	212	18.7	4,039	158	42.4
1934	3,030	3,382	6,412	25.2	21,712	1,298	427	17.3	248	21.6	3,965	153	41.0
Boston & Maine....1935	8,621	6,857	15,478	14.7	23,654	1,733	647	19.3	324	23.6	2,544	102	41.2
1934	8,868	6,033	14,901	15.0	24,714	1,773	647	19.8	344	25.6	2,543	102	35.3
N. Y., New Hav. & Hartf..1935	14,765	10,366	25,131	16.0	24,921	1,706	611	19.5	260	20.5	3,192	100	45.7
1934	15,827	9,584	25,411	12.3	25,746	1,684	599	19.5	253	20.3	3,141	101	39.1
Great Lakes Region:													
Delaware & Hudson....1935	11,030	2,683	13,713	4.3	25,323	1,890	853	27.3	369	21.0	6,060	107	31.7
1934	11,871	2,416	14,287	4.1	26,420	1,905	827	27.0	354	21.8	5,962	109	31.7
Del., Lack. & Western....1935	16,523	6,574	23,097	11.3	26,798	1,770	666	21.5	260	18.3	6,056	140	48.1
1934	16,732	4,179	20,911	11.8	26,675	1,706	623	21.2	321	23.8	6,772	134	51.5
Erie (incl. Chi. & Erie)....1935	22,459	11,756	34,215	6.0	40,722	2,457	901	22.3	529	36.6	7,845	90	47.1
1934	24,840	13,781	38,621	6.7	42,432	2,553	893	21.9	480	36.1	7,999	91	47.3
Grand Trunk Western....1935	4,577	6,592	11,169	19.5	31,930	1,621	532	19.6	343	28.4	3,808	90	51.9
1934	5,102	6,628	11,730	14.0	30,184	1,577	518	20.1	294	24.6	3,425	92	46.7
Lehigh Valley 1935	14,212	6,933	21,145	11.5	33,426	1,938	766	24.3	364	23.0	5,761	126	37.7
1934	18,400	5,410	23,810	18.2	31,698	1,771	673	23.4	337	22.9	6,006	128	43.7
New York Central....1935	122,620	60,685	183,305	19.3	34,135	1,988	784	24.5	306	20.5	5,139	97	52.2
1934	138,757	53,879	192,636	19.4	34,929	2,062	822	25.3	309	20.4	5,440	97	50.6
N. Y., Chi. & St. Louis....1935	8,267	6,664	14,931	4.5	35,503	1,898	662	20.6	569	43.8	5,117	84	74.1
1934	8,899	6,327	15,226	5.1	33,506	1,873	654	21.3	632	49.4	5,795	89	88.7
Pere Marquette 1935	10,143	4,477	14,620	4.6	24,792	1,471	564	24.3	365	24.6	2,544	89	64.0
1934	11,252	4,545	15,797	3.3	24,775	1,462	529	22.9	332	24.8	2,485	88	69.5
Pittsburgh & Lake Erie....1935	15,738	11,759	27,497	45.2	50,405	3,394	1,889	48.5	142	5.1	16,678	87	29.3
1934	16,279	10,590	26,869	43.2	49,852	3,335	1,870	47.2	139	4.9	15,970	87	28.4
Wabash 1935	13,209	8,343	21,552	3.2	34,775	1,728	560	18.8	414	35.0	3,668	103	51.1
1934	14,227	8,390	22,617	3.7	33,836	1,694	555	19.2	411	35.4	3,802	105	51.6
Central Eastern Region:													
Baltimore & Ohio....1935	73,931	20,546	94,477	19.1	25,587	1,871	797	28.0	327	18.8	4,893	137	38.8
1934	82,199	20,588	102,787	17.7	26,420	1,958	853	30.0	348	19.5	5,707	135	41.8
Central of New Jersey....1935	12,825	8,245	21,070	30.1	25,555	2,051	938	31.0	190	10.3	5,847	145	35.7
1934	16,586	6,841	23,427	33.9	27,710	2,250	1,032	32.2	181	9.9	6,159	128	31.6
Chicago & Eastern Illinois..1935	3,730	2,502	6,232	13.0	23,849	1,207	493	23.9	386	23.8	2,560	129	45.9
1934	4,734	2,412	7,146	19.3	23,243	1,290	519	25.1	382	24.3	2,907	119	49.0
Elgin, Joliet & Eastern....1935	7,747	2,496	10,243	7.2	17,340	1,703	836	36.7	211	9.2	4,977	110	30.4
1934	9,091	3,693	12,784	17.6	16,074	1,596	746	36.6	138	6.6	3,961	117	27.3
Long Island 1935	775	2,707	3,482	4.2	5,102	610	231	28.2	58	3.9	518	336	25.7
1934	783	2,683	3,466	2.1	6,099	742	290	29.1	66	4.3	581	302	22.5
Pennsylvania System 1935	236,096	52,107	288,203	15.8	32,825	2,269	970	28.1	269	15.2	7,739	113	40.2
1934	244,871	47,993	292,864	12.8	32,940	2,283	983	29.2	278	15.7	8,136	114	42.2
Reading 1935	30,771	7,472	38,243	8.9	24,276	1,868	845	32.0	238	12.4	6,268	148	34.8
1934	35,811	7,138	42,949	10.6	24,769	1,939	885	32.7	236	12.4	6,961	143	36.9
Pocahontas Region:													
Chesapeake & Ohio....1935	41,834	10,450	52,284	2.0	49,515	3,356	1,770	43.9	777	32.0	13,312	72	48.9
1934	41,794	11,934	53,728	1.9	50,678	3,561	1,887	45.6	903	36.5	15,765	69	51.5
Norfolk & Western....1935	34,607	4,648	39,255	2.8	46,494	3,078	1,587	41.6	703	28.6	12,858	100	49.0
1934	36,516	4,143	40,659	3.0	46,914	3,096	1,547	40.5	698	29.5	13,116	97	46.3
Southern Region:													
Atlantic Coast Line....1935	21,769	4,917	26,686	21.0	17,579	957	328	18.4	190	16.5	985	118	36.9
1934	24,989	3,865	28,854	24.9	17,562	942	315	18.3	174	15.7	976	125	36.5
Central of Georgia....1935	6,022	3,543	9,565	19.0	20,318	1,117	393	19.2	313	24.6	1,589	122	55.3
1934	6,617	3,222	9,839	23.4	19,761	1,128	394	19.4	303	24.1	1,579	122	55.3
Illinois Central (incl. Y. 1935	42,616	16,172	58,788	35.7	24,848	1,415	556	24.3	403	26.3	3,594	123	50.0
& M. V.)....1934	54,105	15,455	69,560	39.8	24,745	1,430	544	24.9	340	23.4	3,570	125	49.5
Louisville & Nashville....1935	41,024	7,479	48,503	27.7	23,232	1,471	676	31.3	388	20.7	3,734	127	52.6
1934	49,307	7,444	56,751	31.6	23,327	1,435	639	30.6	324	18.4	3,633	132	51.2
Seaboard Air Line....1935	9,869	3,640	13,509	4.3	20,402	1,142	398	19.3	394	31.2	1,240	119	48.1
1934	11,632	3,687	15,319	7.1	20,911	1,215	430	20.7	398	31.1	1,420	117	51.8
Southern 1935	25,338	14,343	39,681	13.1	20,841	1,178	425	19.5	388	30.4	2,335	141	46.0
1934	31,656	13,116	44,772	20.0	20,258	1,161	409	19.2	320	25.9	2,171	143	39.7
Northwestern Region:													
Chi. & North Western....1935	42,330	24,614	66,944	10.2	23,299	1,528	526	20.5	221	16.6	1,752	116	40.1
1934	43,530	19,117	62,647	12.2	24,351	1,606	559	21.0	269	20.9	1,996	113	40.6
Chicago Great Western....1935	1,932	2,931	4,863	2.7	31,919	1,704	602	21.3	838	63.4	2,794	120	73.6
1934	2,281	2,890	5,171	2.4	34,294	1,825	608	20.5	854	70.8	3,020	117	79.4
Chi., Milw., St. P. & Pac..1935	49,617	16,387	66,004	2.5	25,120	1,577	609	23.8	345	23.4	2,049	116	62.8
1934	57,057	15,944	73,001	5.1	26,086	1,637	610	23.0	337	24.6	2,205	111	50.6
Chi., St. P., Minneap. & Om..1935	1,926	7,156	9,082	9.6	17,916	1,231	503	24.2	341	21.1	1,885	107	46.8
1934	2,074	6,807	8,881	10.2	18,589	1,241	498	24.1	384	25.1	2,064	107	48.5
Great Northern 1935	41,281	9,496	50,777	8.5	35,070	2,192	973	30.0	428	23.4	2,633	101	38.6
1934	42,183	9,444	51,627	9.3	31,768	1,991	841	27.2	399	24.2	2,478	109	42.9
Minneap., St. P. & S. St. M..1935	13,687	4,537	18,224	4.9	20,722	1,271	533	23.8	331	20.8	1,404	94	77.8
1934	16,351	3,222	19,573	4.2	20,382	1,262	468	21.3	270	21.1	1,233	98	73.9
Northern Pacific 1935	33,046	4,753	37,799	11.7	27,947	1,701	651	22.7	334	22.0	1,967	145	50.8
1934	38,881	4,431	43,312	13.8	28,655	1,709	643	22.8	330	23.1	2,230	147	49.7
Oreg.-Wash. R. R. & Nav..1935	7,001	1,956	8,957	6.2	23,398	1,421	539	21.7	314	21.3	1,340	144	47.1
1934	8,164	2,688	10,852	3.5	21,529	1,300	491	21.0	222	15.4	1,119	148	44.2
Central Western Region:													
Alton 1935	2,253	6,863	9,116	20.6	32,388	1,404	492	23.3	336	25.0	3,327	103	69.6
1934	3,254	6,679	9,933	22.6	28,347	1,381	482	23.0	320	23.7	3,447	112	73.4
Atch., Top. & S. Fe (incl. 1935	71,680	11,052	82,732	11.6	31,500	1,678	533	19.8	352	28.7	2,193	112	59.0
G.C. & S.F. & P. & S.F.)..1934	76,340	10,670	87,010	12.6	32,735	1,782	575	20.5	360	29.4	2,354	99	58.4
Chi., Burl. & Quincy....1935	31,476	14,284	45,760	8.0	24,478	1,409	584	24.4	454	29.8	2,316	117	71.5
1934	34,146	12,837	46,983	9.0	25,863	1,500	592	23.5	476	34.1	2,459	113	71.7
Chi., Rock I. & Pac. (incl. 1935	29,222	11,818	41,040	14.6	23,238	1,328	473	21.5	380	28.5	1,881	124	53.5
Chi., Rock I. & Gulf)....1934	33,104	10,242	43,346	21.0	23,967	1,350	500	22.5	392	28.4	2,041	125	59.2
Denv. & Rio Gr. Western..1935	13,347	3,173	16,520	5.3	23,735	1,535	633	24.4	273	16.5	1,747	157	40.5
1934	14,006	3,470	17,476	5.3	25,258	1,600	580	22.1	246	17.8	1,632	164	41.7
Los Angeles & Salt Lake...1935	4,170	941	5,111	9.4	29,629	1,715	635	20.8	604	41.9	2,519	134	70.1
1934	4,628	977	5,605	8.9	30,984	1,762	686	24.3	656	42.6	2,985	134	76.7
Oregon Short Line....1935	7,829	2,868	10,697	24.0	25,570	1,438	499	20.9	405	32.2	1,745	116	54.5
1934	8,479	2,565	11,044	21.6	25,474	1,487	533	21.0	365	27.1	1,632	112	46.8
Southern Pac.—Pac. Lines..1935	34,067	25,930	59,997	8.5	33,518	2,099	637	19.9	415	35.8	2,895	99	59.6
1934	35,292	25,672	60,964	8.9	31,944	2,020	652	20.8	452	36.7	3,203	101	60.0
Union Pacific 1935	24,459	9,268	33,727	17.7	51,794	2,128	719	20.8	595	47.0	5,595	105	75.2
1934	24,279	8,902	33,181	19.4	49,586	2,093	626	19.5	559	52.2	4,924	103	74.4
Southwestern Region:													
Mo.-Kans.-Texas Lines 1935	5,665	3,752	9,417	3.5	29,033	1,581	550	20.6	674	51.9	1,933	78	61.0
1934	7,440	3,762	11,202	2.6	28,885	1,572	538	20.6	562	44.9	1,919	82	55.4
Missouri Pacific 1935	18,770	18,264	37,034	3.8	28,638	1,605	607	22.7	539	36.8	2,772	115	65.1
1934	22,049	18,946	40,995	4.0	29,769	1,659	598	22.7	523	39.3	2,926	115	67.8
St. Louis-San Francisco....1935	20,808	6,174	26,982	5.2	23,219	1,263	508	24.1	386	24.8	2,087	121	47.6
1934	22,231	4,588	26,819	7.4	23,538	1,329	499	23.2	387	28.0	2,049	122	44.5
St. Louis Southw. Lines....1935	3,181	3,539	6,720	5.7	29,636	1,550	482	19.1	557	49.9	2,110	86	67.0
1934	4,490	2,499	6,989	9.9	25,723	1,384	469	19.6	454	37.0	1,763	94	55.7
Texas & New Orleans....1935	7,285	9,991	17,276	8.3	25,584	1,408	442	20.4	417	36.2	1,628	86	56.2
1934	8,126	10,119	18,245	8.9	24,276	1,370	477	21.6	404	31.3	1,662	88	51.6
Texas & Pacific....1935	2,758	4,408	7,166	5.8	31,035	1,783	605	19.9	741	56.1	2,729	78	39.7
1934	3,630	3,903	7,533	7.9	29,215	1,826	601	19.6	654	52.3	2,531	82	35.4

A recovery check list for railroads



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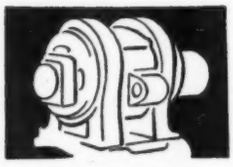

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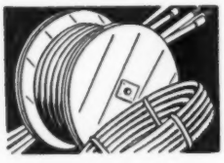

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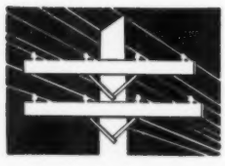

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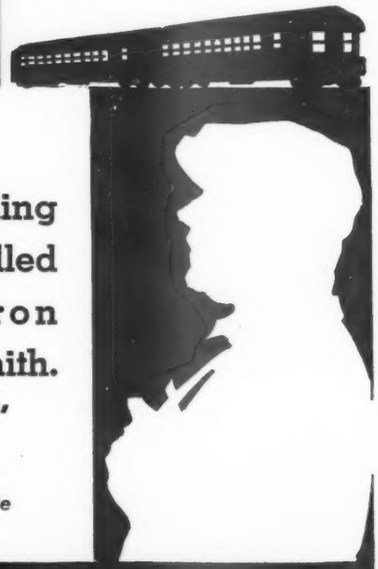
"The pipe we put there will have to stand a lot of grief."



"Make it Reading Genuine Puddled Wrought Iron Pipe, Mr. Smith. It can take it."

For quotations, write or wire,

READING IRON COMPANY

PHILADELPHIA

SCIENCE AND INVENTION HAVE NEVER FOUND A SATISFACTORY SUBSTITUTE FOR GENUINE PUDDLED WROUGHT IRON

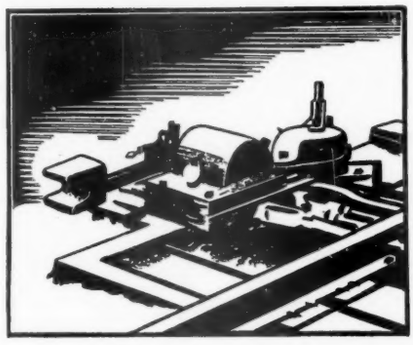
Added Safety for High-Speed Trains

POSITIVE DISTANT-SIGNAL WARNING DIRECTLY FROM THE SWITCH POINTS

THE new Five-Point Safety Switch Control known as the Bethlehem Positive Signal Stand gives a positive, continuous report on conditions right at the switch points. It instantly warns of any danger lurking at switches, even when of such a nature that the target indicates clear. For example, in cases where a switch has been run through, leaving the points open without changing the target position.

Besides fulfilling the usual functions of a switch stand, the Bethlehem Positive Signal Stand throws a derail in a turnout, operates a distant-signal indication and also embodies a two-rod facing-point lock and detector-bar protection for the switch points.

No possible cause of trouble at a switch is overlooked by this Bethlehem development. Any switch in track-circuit territory, however remote, can be completely safeguarded.



★ FIVE POINTS OF SAFETY

1 Danger is indicated the instant the switch-stand lever is lifted.

2 The siding derail is maintained open or closed relative to the main line switch position.

3 Switch points are double-locked, by two rods, for main line movement. Obstructions between the point and stock rail are instantly detected, as the throwing lever cannot be locked until the retarding object is removed and the point is in contact with the stock rail.

4 Danger is indicated at a distant signal whenever points are more than ⅛-inch from through-movement position. Signal remains "red" until the points are returned and locked for main track operation.

5 When the switch is run through, the detector bar is actuated, closing the electric circuit and automatically indicating danger at the distant signal. The "red" signal will remain until the damage is repaired and the points restored to the normal position.

Any derangement leaving the points open more than ⅛-in. is instantly revealed.

The Bethlehem Positive Signal Stand provides the opportunity to raise safety standards to a new high level. The steadily increasing speed of all classes of traffic makes this additional safety highly desirable.

The design of the Bethlehem Positive Signal Stand provides the three features most desirable in such an important signal device:

1 Ease of installation
2 Ease of adjustment
3 Ready accessibility for inspection and maintenance.

Write for booklet giving complete, detailed information on this new development.

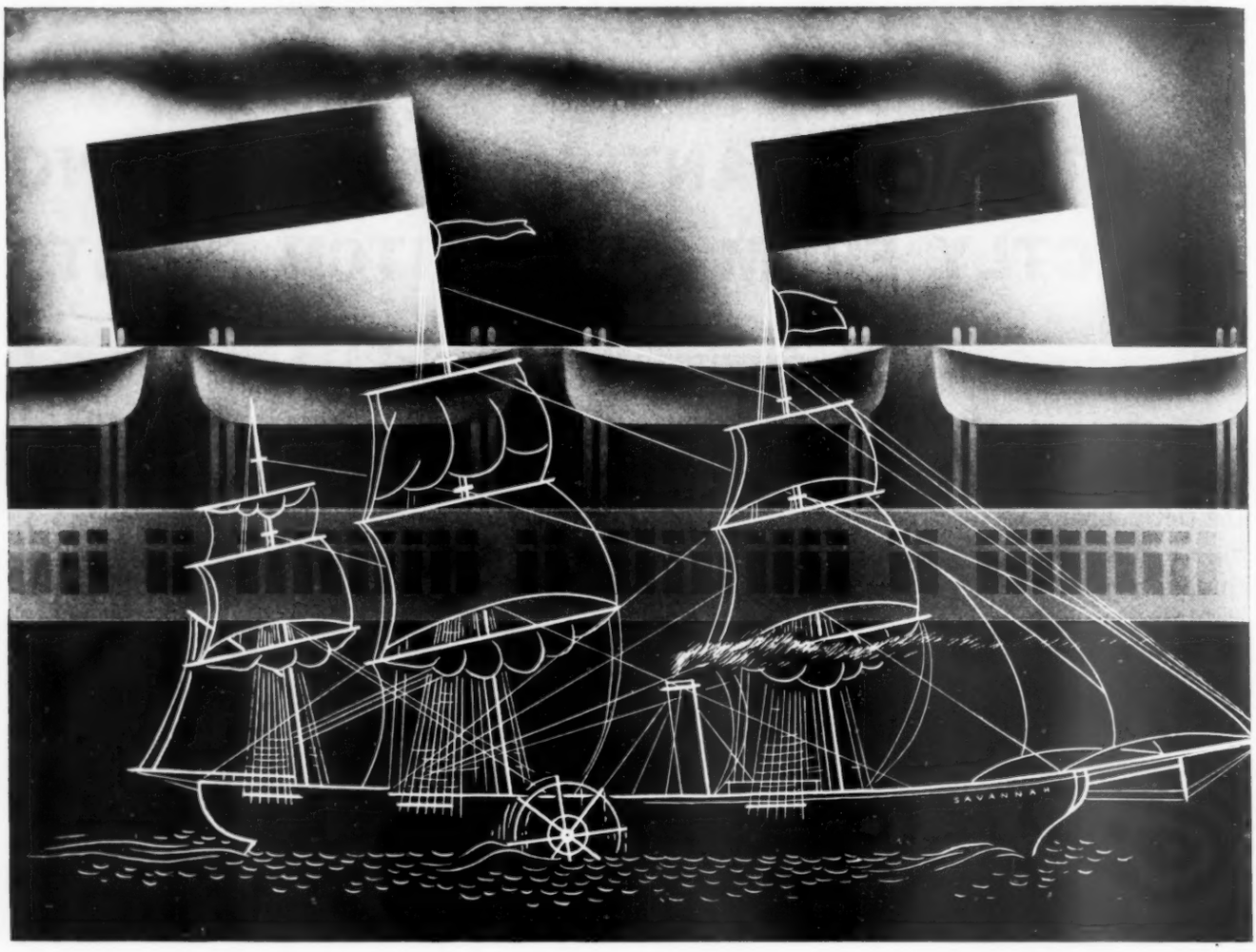
★ ★ ★

District Offices: Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Milwaukee, New York, Philadelphia, Pittsburgh, San Antonio, St. Louis, St. Paul, Washington, Wilkes-Barre, York. *Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Seattle, Los Angeles, Portland, Salt Lake City, Honolulu. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.



Marvel of her era . . . outclassed today

WHEN the Savannah made her epic crossing of the Atlantic, she was hailed as the ultimate in steam-powered vessels. Yet such succeeding queens of the sea as the Great Eastern, the St. Louis and the Deutschland reigned under the similar popular belief that the limits of size, speed, luxury and safety in ocean liners had finally been reached. Today, even while the magnificent Normandie is ushering in another epoch in ocean transportation her alert owners are giving heed to the needs and problems the future may bring.

Steamship history has many parallels. Take steel. Since the basic discoveries of Kelly and Bessemer, steel progress has been restless with change . . . less visible, perhaps, than is possible with steamships, or skyscrapers, but gradual and pronounced nevertheless. The use of element after element has been developed to improve steel's qualities or to endow it with new properties for different purposes.

Many of such alloyed steels of the past two decades have come to be regarded as "satisfactory" for the uses they serve . . . mainly because engineers, superintendents and shop foremen have become accustomed to their characteristics. Yet change — progress — is still on the march. No advance of the past decade has been more significant than that afforded by Molybdenum. Widely proved during many years and in thousands of laboratory tests, and foundry, shop and service applications, this really unique alloying element has been found capable not only of improving practically all of steel's generally desired properties, but of enabling other alloys better to serve their particular purposes.

To engineers, metallurgists and production executives we offer these interesting books: "Molybdenum in 1934" and "Molybdenum in Cast Iron — 1934 Supplement." Also ask us to mail you our periodical news-sheet, "The Moly Matrix." Be free, too, to enlist our Detroit experimental laboratory's help at any time. Climax Molybdenum Co., 500 Fifth Ave., New York.

Visit the Climax exhibit in booths K-41 and L-42 at the National Metal Exposition, Chicago, Sept. 30—Oct. 4

MOLY

CLIMAX **Mo-lyb-den-um**

INDUSTRY'S MOST MODERN AND VERSATILE ALLOY

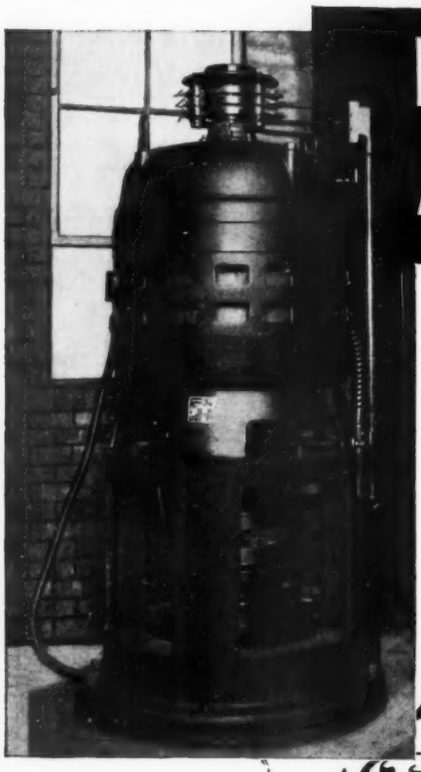
● Storage Batteries are installed as comfort insurance. The Storage Battery is the weakest—or the strongest—link in railroad car-lighting and air-conditioning. Storage Battery failure for a few hours can cause a patron to forget the splendid service your road has given him for many years.

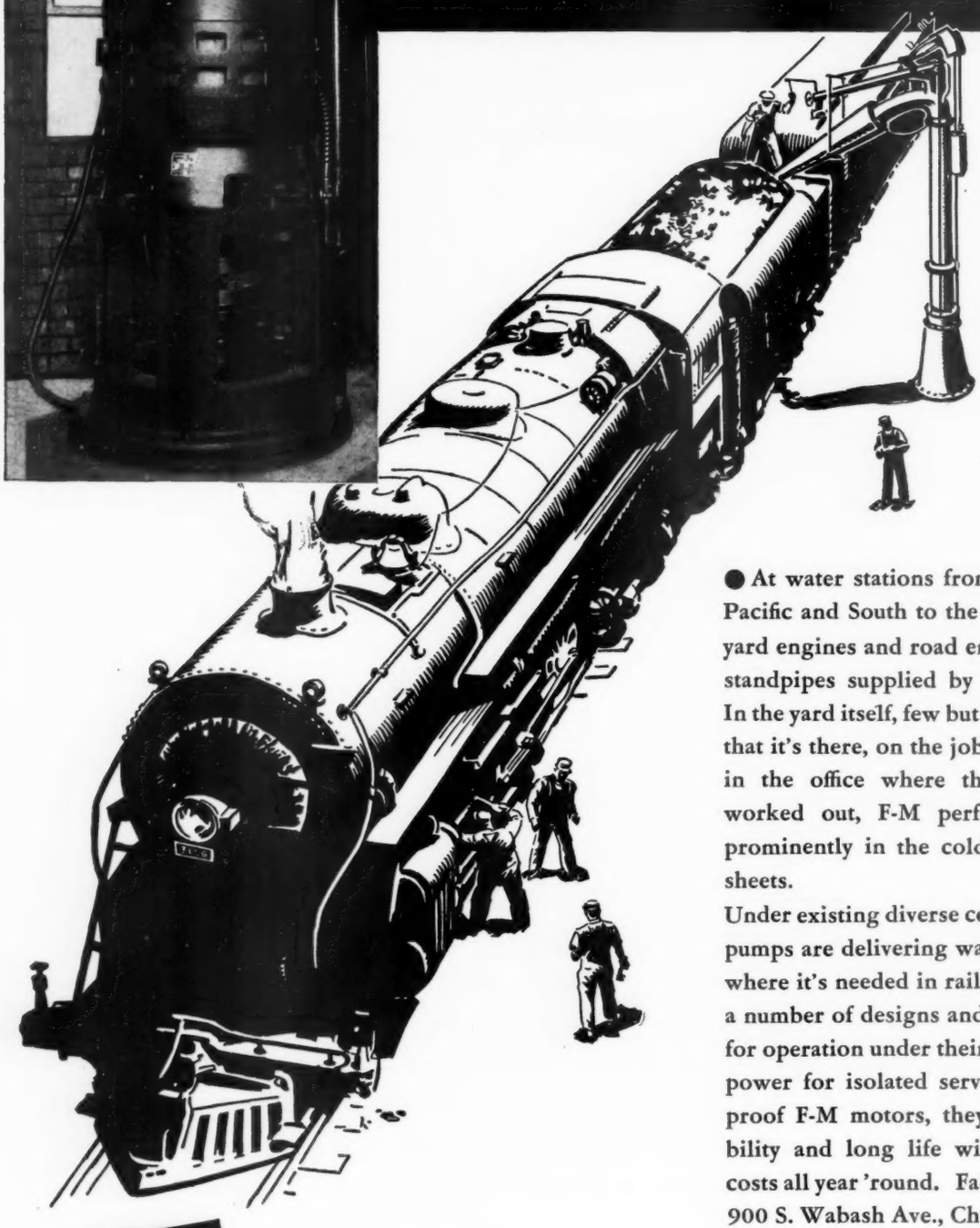
Realization of this important point explains, in great measure, today's marked trend to employ the Edison Alkaline Battery exclusively. It is more dependable—a fact that is never challenged. It obviates the danger of unexpected battery failure between car shoppings . . . cuts operating costs . . . lasts two to five times longer—yet adds only 5 to 10% to the initial cost of air-conditioning a car.

EDISON STORAGE BATTERY

DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, NEW JERSEY

LOCOMOTIVE WATERING AT LOW PUMPING COST





● At water stations from the Atlantic to the Pacific and South to the Gulf and in Mexico, yard engines and road engines water up from standpipes supplied by F-M turbine pumps. In the yard itself, few but attendants may know that it's there, on the job 24 hours a day—but in the office where the water figures are worked out, F-M performance stands out prominently in the cold figures on the cost sheets.

Under existing diverse conditions F-M turbine pumps are delivering water when it's needed, where it's needed in railway service. Built in a number of designs and capacities, equipped for operation under their own low-cost Diesel power for isolated service or with weather-proof F-M motors, they offer real dependability and long life with reduced pumping costs all year 'round. Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

Pioneer Designers and Manufacturers of POWER, PUMPING AND WEIGHING EQUIPMENT 105 Years

F-M

FAIRBANKS-MORSE

TURBINE PUMPS

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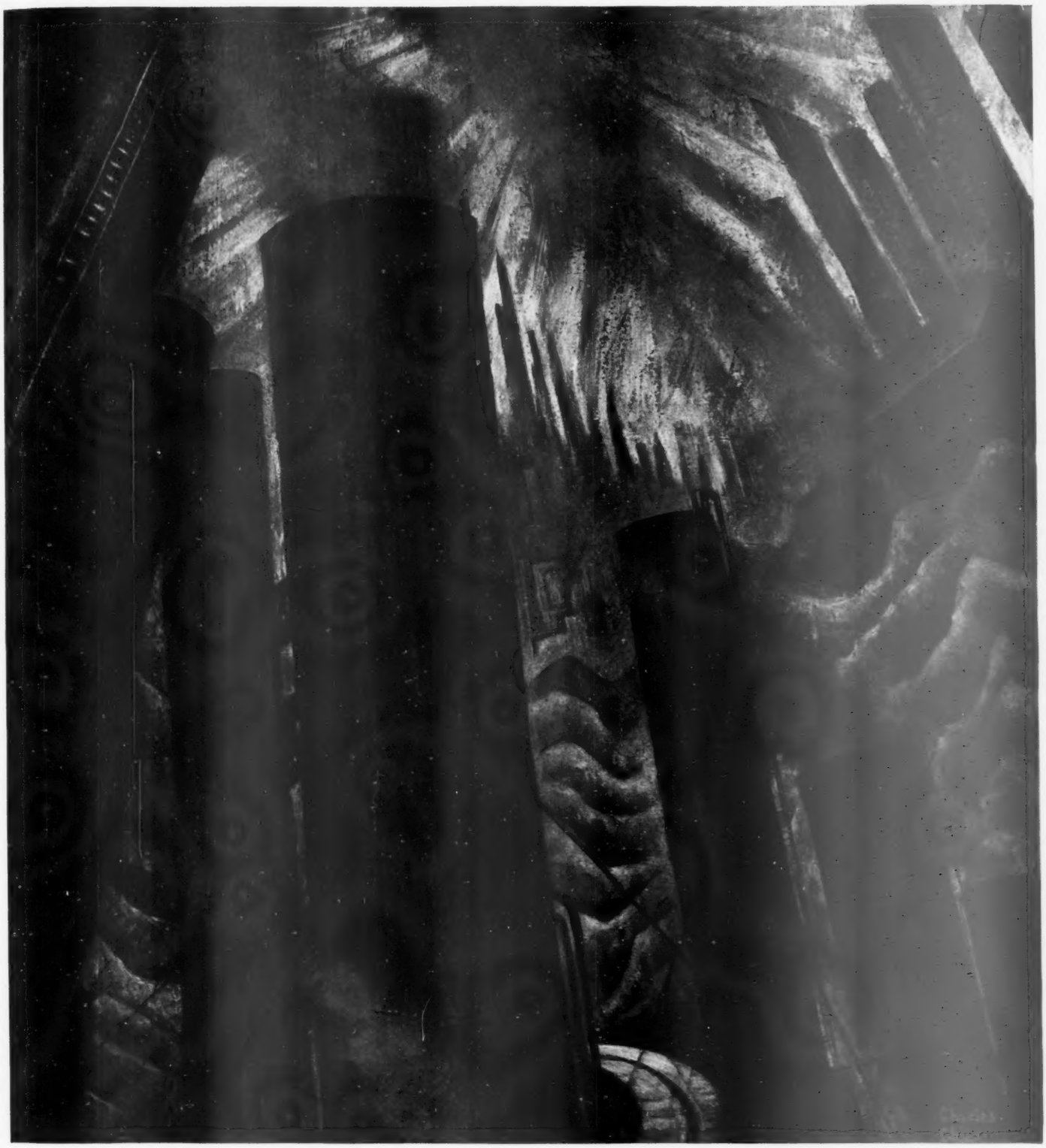


SERVANT OF INDUSTRY

THE marked tendency toward increased specialization in the steel requirements of modern industry is reflected in ever-higher standards in the making and treating of steels. In recognition of the growing importance of precision heat-treatment, Bethlehem is placing the main emphasis on facilities for heat-treating in its exhibit at the National Metal Show.

Facilities that embody the most advanced practice, not only in heat-treating but in rolling, teeming, melting, and other divisions of steel-making, are important factors in Bethlehem's position as capable servant to steel-consuming industries of every class.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

The Bethlehem Exhibit *at the* National Metal Show

VISITORS to the National Metal Exposition will find working models depicting the operation of two Bethlehem departments which contribute importantly to Bethlehem's ability to serve present-day transportation and industry.

Heat-Treatment of Wrought Steel Wheels

HEAT-TREATMENT of the rims of wrought steel wheels, a development pioneered by Bethlehem engineers, gives Bethlehem Wheels great hardness and toughness, effectively armoring them against wear. These are the wheels that are in use on the Burlington's Zephyr and other fast trains of both the new light-weight and conventional types.

The working model at the National Metal Show portrays the entire heat-treatment process. You see the wheel enter and leave the furnace. You see it quenched, charged into the drawing furnace, taken by a crane to the cooling pit.

In addition to this working model, transparencies will depict the forging and rolling processes by which Bethlehem Wheels are made.

Electric Heat-Treatment of Bars

BETHLEHEM'S electrically operated bar heat-treating plant is the largest in the world devoted to the hardening and annealing of mill-length bars. It embodies the most recent improvements in heat-treating practice, applying on a commercial scale the exact methods of the laboratory.

In the working model the automatic charging of the bars into the pre-heating furnace is shown, and their automatic transfer to the high-temperature furnace. The bars are then shown leaving the high-temperature furnace and being picked up by the crane, which carries them to the tank where they are quenched, after which they are deposited on the discharging rack.

Other noteworthy features of the Bethlehem exhibit will include the following products:

Bethlehem Alloy Studs and Bolts

THESE studs and bolts, made from specially developed alloy steels, are Bethlehem's answer to the need of industry, particularly the oil, power and chemical fields, for fastenings capable of long, trouble-free service in installations involving exposure to high pressures and high temperatures, and corrosive action.

The exhibit will also include Bethlehem Hot-Forged Nuts, Heat-Treated and Oil-Quenched.

Bethanized Wire

A BETHLEHEM development of far-reaching importance. Bethanized Wire is steel wire zinc-coated by a new process which results in lighter, purer, more ductile and heavier coatings than were ever before possible. Chain-link and farm fence and other products made from this new kind of zinc-coated wire will be exhibited.

Bethadur and Bethalon

BETHLEHEM corrosion-resisting steels, covering a wide range of uses.

BETHLEHEM

Servant of Rail Transportation

Wrought Steel Wheels

Forged Steel Axles

Trackwork

Rails and Accessories

Track Spikes

Bolts and Nuts

Steel Freight and Passenger Cars

Alloy Steels

Tool Steels

Structural Shapes

Steel Sheet Piling

Steel H-Piling

Reinforcing Bars

Carbon Steel Bars

Steel Sheets

Steel Plates

Flanged Products

Boiler Tubes

Steel Pipe

Steel Castings

Forgings

Wire

Bethanized Fence

Bethlehem District Offices are located at Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Milwaukee, New York, Philadelphia, Pittsburgh, San Antonio, St. Louis, St. Paul, Washington, Wilkes-Barre, York. *Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Seattle, Los Angeles, Portland, Salt Lake City, Honolulu. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

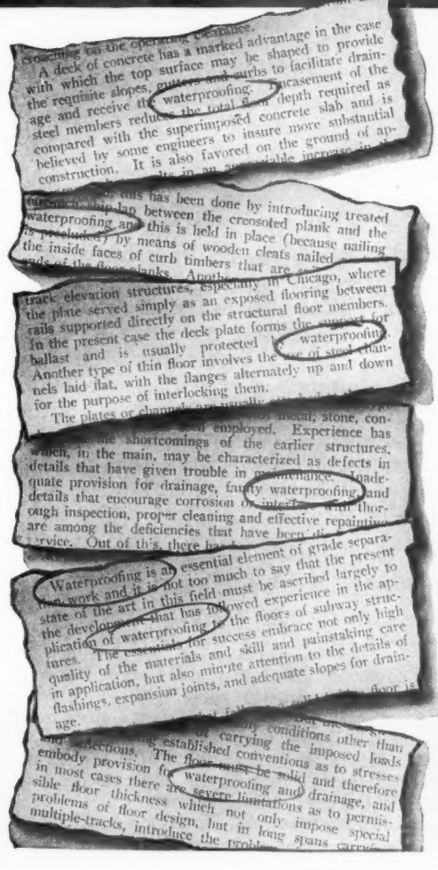
BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

WHAT RAILWAY AGE SAYS ABOUT WATERPROOFING GRADE SEPARATIONS

$200,000,000 for Grade Separation
Fund allotted by federal government, which may be used also for protection, will advance program for reducing hazard at railway-highway crossings, with benefit to all
States and Railways Analyze Situation In Hope To Push Grade Crossing Work
Structures for Grade Separations



In its recent survey of all aspects of the grade crossing elimination situation, *Railway Age* laid great stress upon the importance of adequate waterproofing and the damage that follows the omission of waterproofing or the use of inadequate waterproofings.

Koppers has prepared a special technical bulletin on waterproofing and dampproofing bridges, viaducts, tunnels, underpasses and other structures used on grade crossing elimination work. Send the coupon below for your copy.

KOPPERS

KOPPERS PRODUCTS COMPANY, KOPPERS BUILDING, PITTSBURGH, PA.
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KOPPERS PRODUCTS CO., Pittsburgh, Pa.
Send me a copy of the technical bulletin on Waterproofing Grade Crossing Elimination Structures. RA

Your Name.....

Firm Name.....

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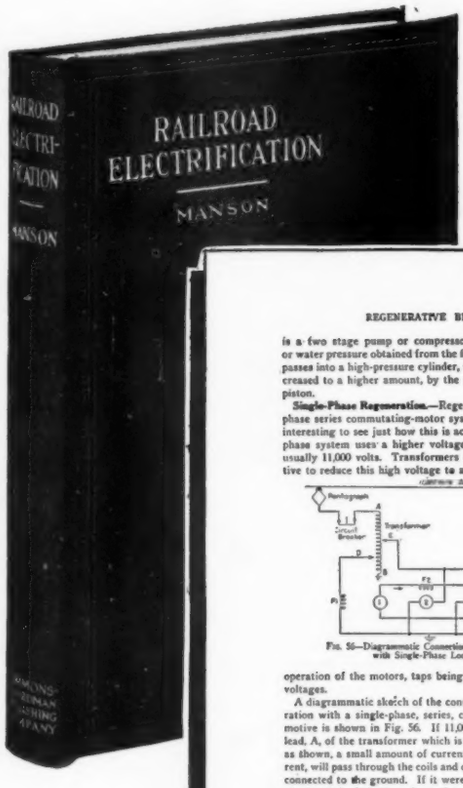
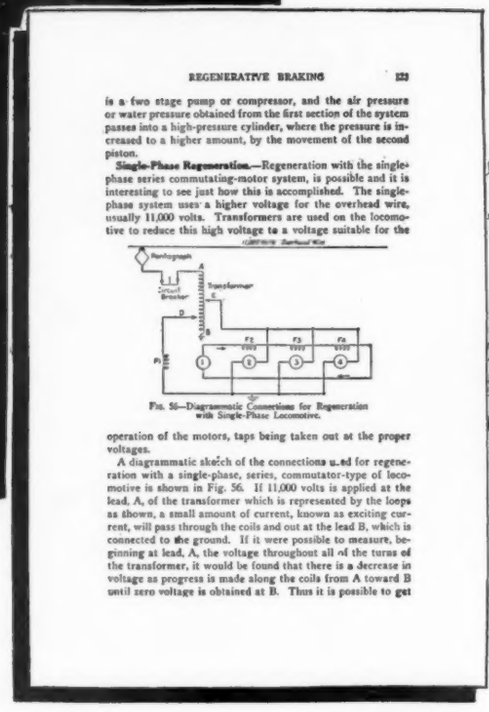
Railroad Electrification and the Electric Locomotive





REGENERATIVE BRAKING 123

is a two stage pump or compressor, and the air pressure or water pressure obtained from the first section of the system passes into a high-pressure cylinder, where the pressure is increased to a higher amount, by the movement of the second piston.

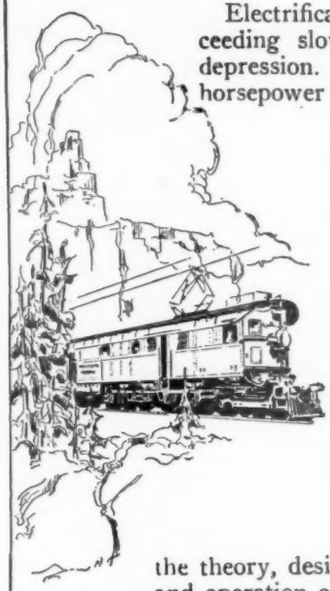
Single-Phase Regeneration.—Regeneration with the single-phase series commutating-motor system, is possible and it is interesting to see just how this is accomplished. The single-phase system uses a higher voltage for the overhead wire, usually 11,000 volts. Transformers are used on the locomotive to reduce this high voltage to a voltage suitable for the

Fig. 56—Diagrammatic Connections for Regeneration with Single-Phase Locomotive.

operation of the motors, taps being taken out at the proper voltages.

A diagrammatic sketch of the connections used for regeneration with a single-phase, series, commutator-type of locomotive is shown in Fig. 56. If 11,000 volts is applied at the lead, A, of the transformer which is represented by the loops as shown, a small amount of current, known as exciting current, will pass through the coils and out at the lead B, which is connected to the ground. If it were possible to measure, beginning at lead, A, the voltage throughout all of the turns of the transformer, it would be found that there is a decrease in voltage as progress is made along the coils from A toward B until zero voltage is obtained at B. Thus it is possible to get

2nd Edition, 332 pages, 148 illustrations cloth, 6 x 9. $3.00



Electrification has been proceeding slowly in spite of the depression. Because of greater horsepower and more serviceability hours a day, one electric is the equivalent of two steam locomotives.

While few roads are at present in a position to make large capital expenditures required for new electrification projects, there is no retrogression in this field. Expansion of electrification continues.

This book covers the theory, design, construction, care and operation of electric locomotives, and their application to all classes of railroad service. It is written by an authority in untechnical language. It is sound enough for the expert yet can be understood by the man who has only a general knowledge of the subject. A set of solutions to typical problems met with in electrification plans is included.

By Arthur J. Manson

Assistant Sales Manager, Transportation Department, Westinghouse Electric & Manufacturing Company

CONTENTS

Advantages of Electrification—Electrical Terms and Their Relation to Mechanics—Ohm's Law—Inductance and Capacity—The Generation of the Electric Current—The Electric Motor—The Alternating-Current Single Phase Motor—The Three-Phase Motor—Railway Motor Characteristic Curves—Motor Combinations for Speed Control—General Principles Relating to the Operation of Trains—Comparison of the Operating Characteristics of Steam and Electric Locomotives—Methods Used for Accelerating Electric Locomotives—Energy Losses Incurred by the Various Methods of Acceleration—Regenerative Braking with Electric Locomotives—The Air Brake Equipment for the Electric Locomotive—Electric Locomotive Design—The Pantagraph—The Third-Rail Shoe—The Transformer and Auxiliary Apparatus—The Control Apparatus—Construction of the Modern Railway Motor—Mechanical Design of the Electric Locomotive—Inspection and Maintenance—The Speed-time Curve—The Continuous Speed-Time Curve and Train Chart—Gear Ratio and Wheel Diameter—An Electrification Problem—Electrification System of the Future—A Brief Survey of Electrification in the United States.

Who's Who in Railroading

The new edition of what was formerly the "Biographical Directory of Railway Officials of America" covers all of North America including Cuba. Biographical sketches of some 4,000 railroad officials, equipment manufacturers, economists, members of regulatory commissions and others whose work is directly connected with the railroad industry are included. The information is based upon original questionnaires. Since 1885 this book has been recognized as the standard authority on who's who in the railroad field.

Ninth edition. 579 pages, 6 x 9 inches, $3.00.

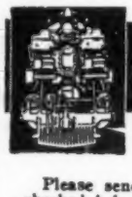
Car Lighting by Electricity

By CHARLES W. T. STUART

Foreman of Car Lighting, Philadelphia Terminal, Pennsylvania Railroad

The only book covering car lighting in accordance with modern practice. The general principles involved in installation and operation of the various systems are carefully explained. All the tools and appliances used in maintenance are described. Includes the specifications covering the car lighting Standards and Recommended Practices of the American Railway Association.

366 pages, 256 illustrations, cloth, 6 x 9, $3.00



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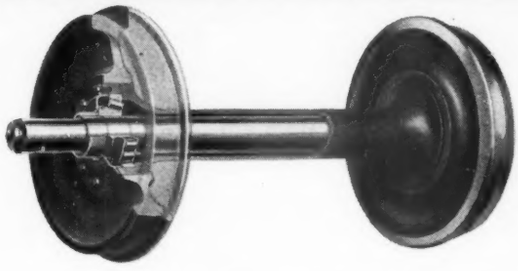


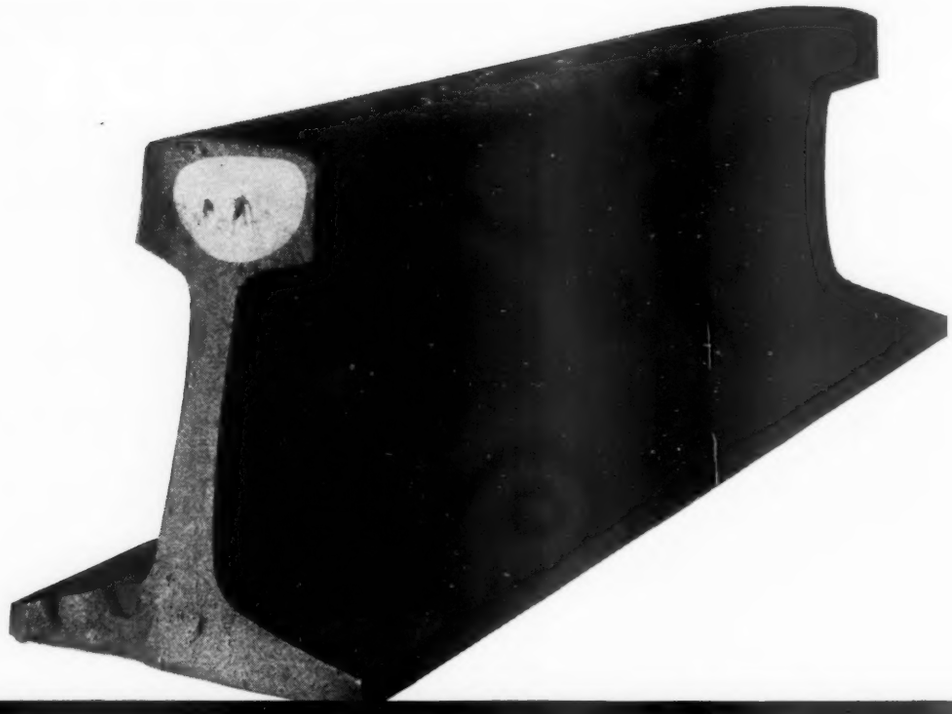
IN prairie country where severe dust storms are frequent, where winter weather lasts for months...in stormy weather and fair . . . locomotive No. 6415 of the Chicago, Milwaukee, St. Paul & Pacific Railroad, equipped with American Steel Foundries *Roller Bearing Units*, covers 18000 miles every 30 days on its regular run between Minneapolis and Harlowton, Montana.

Of prime importance in maintaining this remarkable performance . . . where little time is available for mechanical attention . . . is the DEPENDABILITY of the American Steel Foundries *Roller Bearing Units*.

The use of American Steel Foundries *Roller Bearing Units* eliminates frequent inspections and hot boxes; promotes lubrication economy and increases availability with a minimum of maintenance attention.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



AN INTERVIEW ON RAILS

WE were recently discussing, with an official of one of the large Railroad Companies, the question of Fissured-Rails, illustrated above, and he said:

"Why, Mr._____, we have not had any trouble with Fissured-Rails from your Company for the past six or seven years."

While his statement was gratifying, it did not mean that all Rails were free from such trouble, for fissures do occur, more or less frequently.

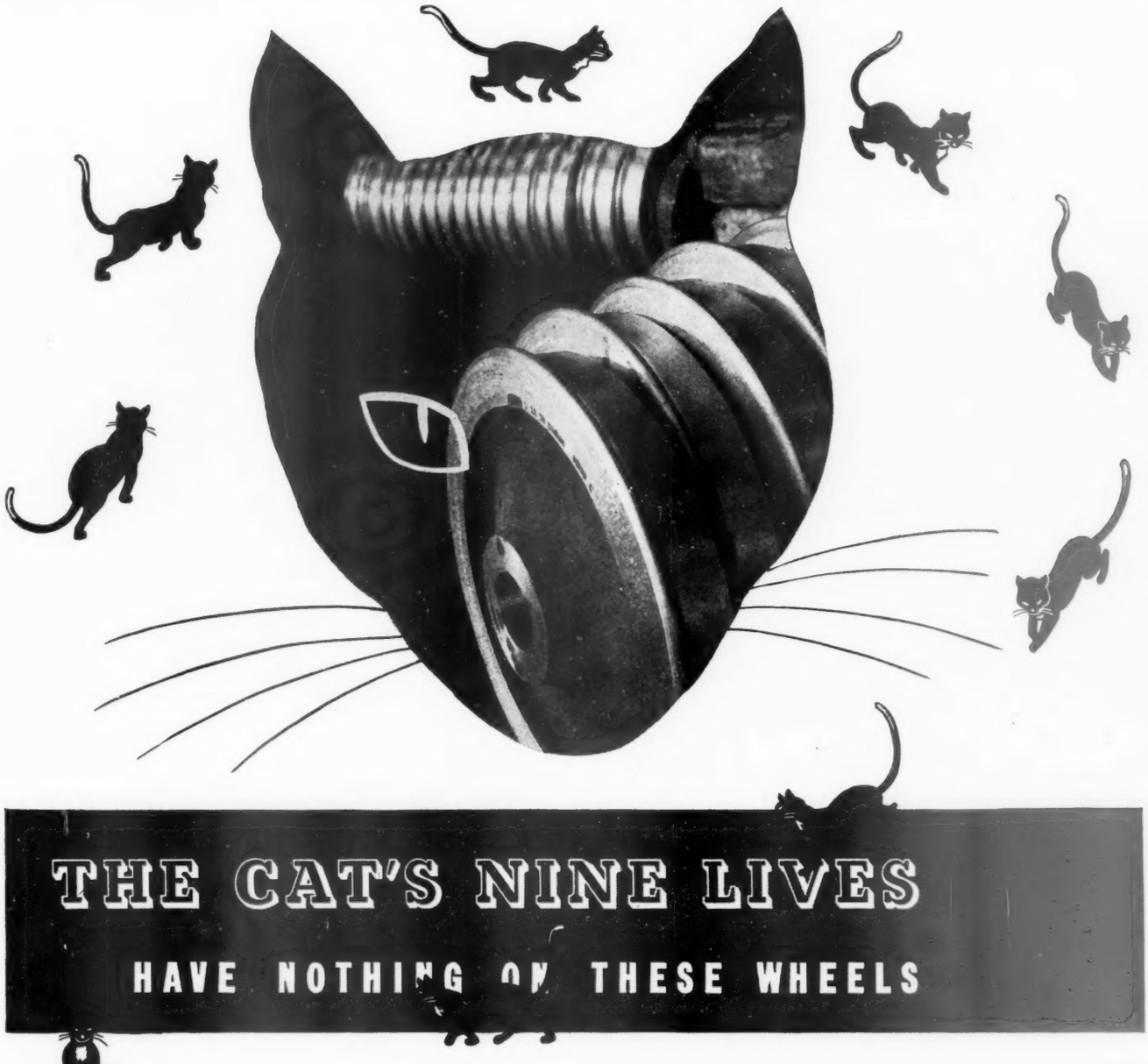
One method for correcting, to a large extent, the so-called "shatter-zone" condition, is through the "Controlled-Cooling" of Rails, from the hot beds.

We have installed, at our Indiana Harbor Works, a unit for treating Rails in such manner, by heats, and are pleased to offer such service to our Railroad friends, as another further improvement in the art of Rail making. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Illinois.

Sheets Strip Tin Plate
Plates Structurals Piling

INLAND STEEL

Rails Track Accessories
Bars Rivets Billets



THE CAT'S NINE LIVES

HAVE NOTHING ON THESE WHEELS

WE don't know much about cats, to say nothing of the "nine lives" myth; but we do know through observation and experience that Armco Multiple-Wear Wheels function safely and efficiently over hundreds of thousands of miles. They should! They're built of sound, uniform steel—steel that takes its punishment without whimpering under the fastest passenger trains and heaviest freight trains. Some call it stamina. Armco Wheel users call it "mighty good mileage." And they also say that Armco Multiple-Wears cost less because there is more wear between turns. Case histories have been showing it for years. Your mileage records will, too. Just call in an experienced Armco Wheel Man from the office nearest you. It's listed below.

FOR YEARS Railroad Men have known the company behind this familiar trademark as an unfailingly good source of supply for iron and steel sheets, plates, and wrought steel wheels.

ARMCO RAILROAD SALES CO.

SUBSIDIARY OF THE AMERICAN ROLLING MILL COMPANY

Executive Offices: Middletown, Ohio

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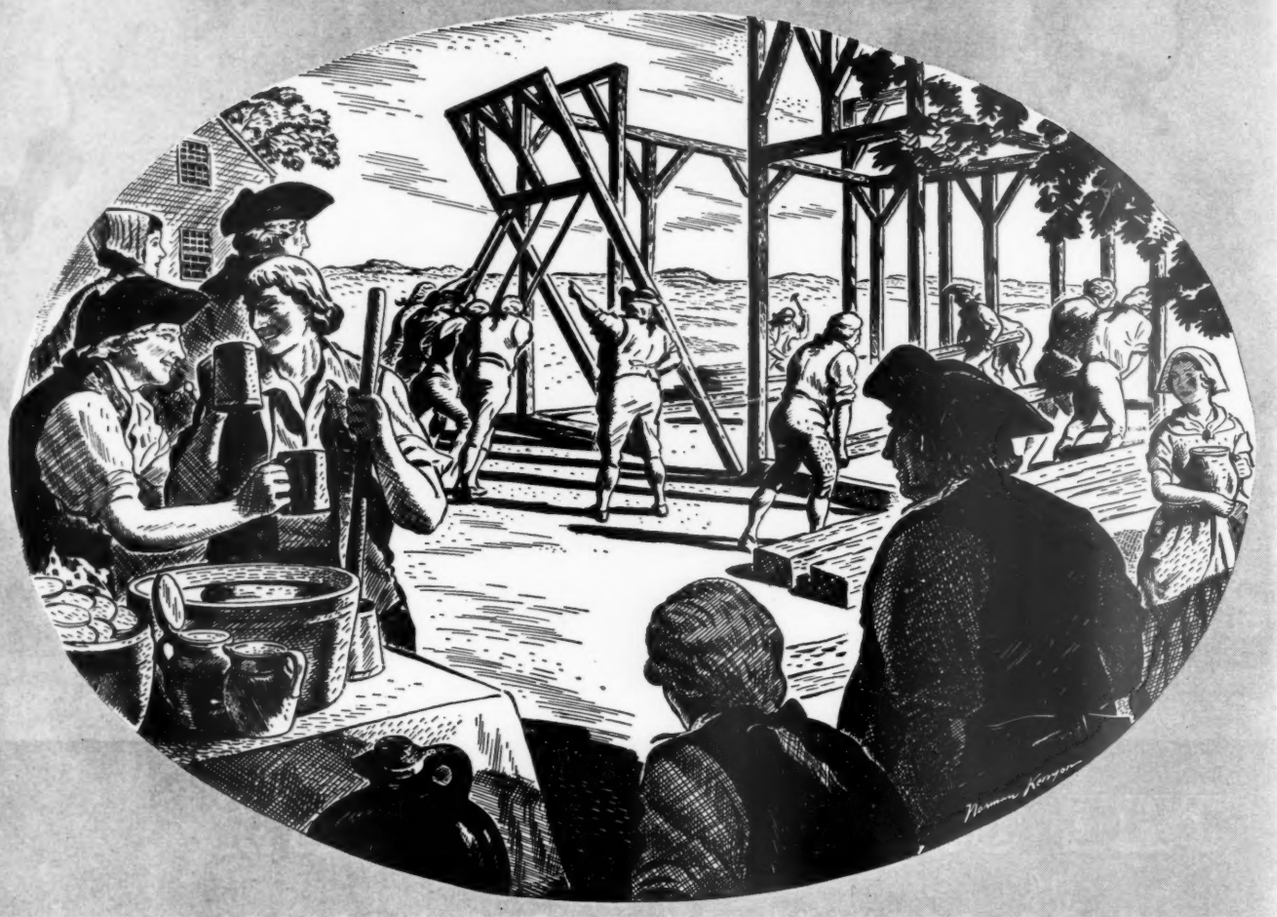
YOUR QUICK GUIDE TO ARMCO PRODUCTS. One-Wear Wheels • Multiple-Wear Wheels • Heat-Treated Wheels Armco Stainless Steels • Passenger Car Sheets • Car Siding Sheets • Freight Car Sheets • Jacket Sheets • Galvanized Sheets

BE A GOOD NEIGHBOR

It's the Best American Tradition



THERE was a time, not so long ago, when being a good neighbor was a real factor in getting America going—and keeping us on our way.

In that day a man and his sons might cut and hew the timbers for a new dwelling and frame them stoutly on the ground. But before the walls could be raised, before the roof could go on, these builders needed and received the help of their neighbors. It was given generously in the old Colonial "house raising."

The same necessity for being a good neighbor, for helping the other fellow whenever he needed help, was recognized in all departments of early American life. Days of labor and the use of teams were exchanged as conditions of the crops demanded. And in time of sickness, fire, drought, attack, each man was in truth his brother's keeper.

In spite of the specialization of modern times, the speed and the scope of business and social life, there is, more than ever, the need for the good old American virtue of being a neighbor. No longer are you called upon to help the other fellow frame and raise his house, or to fight shoulder to shoulder with him against a common foe. But it is your responsibility to support, as you are able, institutions that minister to his welfare and the welfare of his family as definitely as a pioneer ever helped his neighbors. Hospitals, clinics, day nurseries need and deserve your help. . . . So do homes for the aged, the blind, the incurable. . . . So do the agencies that build the youth of your community.

It's still necessary to be a good neighbor. And it's still possible. Support your Community Chest. Answer local welfare appeals. You will be the best possible neighbor in your own neighborhood!

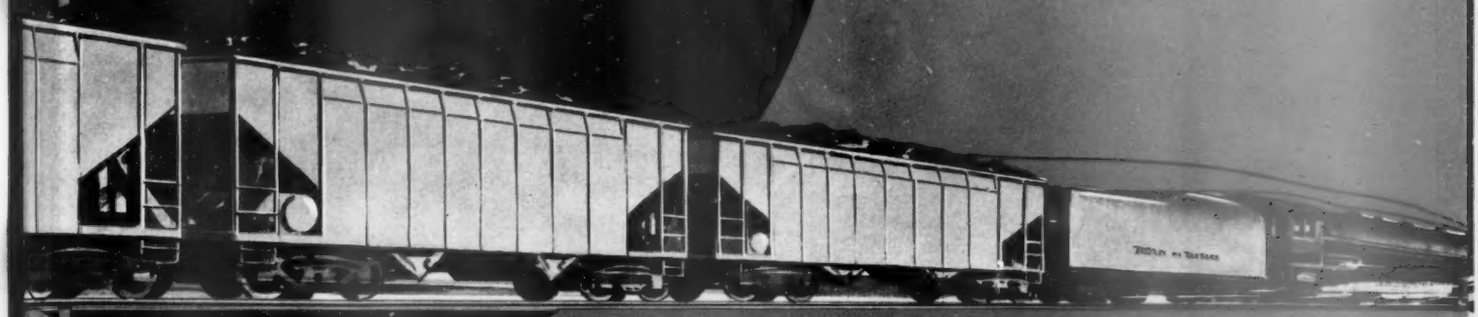
Gurdon Wrope

Chairman,
National Citizens' Committee

All facilities for this advertisement furnished the committee without cost

MOBILIZATION FOR HUMAN NEEDS—1935

20% LESS DEAD WEIGHT *with*



USS HIGH TENSILE STEELS
and what it means—

- A ratio for revenue load to gross weight of 79% to 82%
- A "50-Ton" hopper that will carry 67 to 69 tons of coal
- Lower Operating Costs . . .
- All the strength required for heavy freight service . . . .
- Better resistance to weathering and corrosive ladings
- Equal or longer life—and lower depreciation . . . . .
- Smaller maintenance charges
- More net earnings per ton-mile

Getting the most net c

—*WITH* LIGHT-WEIGHT H

KEY TO ECONOMY

● Shown here diagrammatically is a typical new hopper car constructed of USS High Tensile Steels—USS Cor-Ten and USS Man-Ten.

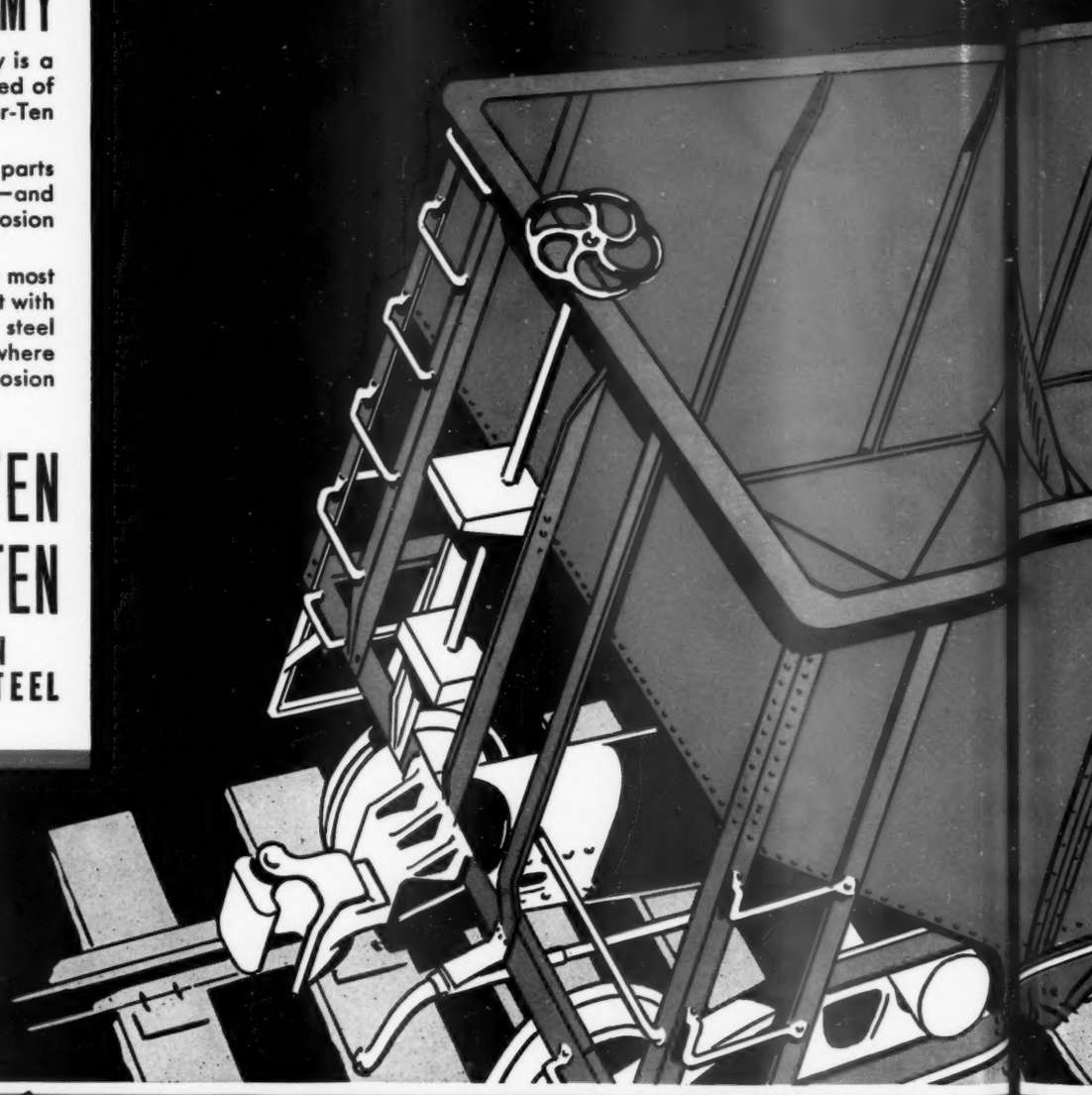
USS Cor-Ten is shown for all parts coming in contact with lading—and therefore requiring greater corrosion resistance.

USS Man-Ten is indicated for most body shapes not in direct contact with the load. Low carbon structural steel is shown only for those parts where neither high strength nor corrosion resistance were essential.

● =USS COR-TEN

● =USS MAN-TEN

● =LOW CARBON STRUCTURAL STEEL



USS HIGH-TENSILE STEELS

USS COR-TEN

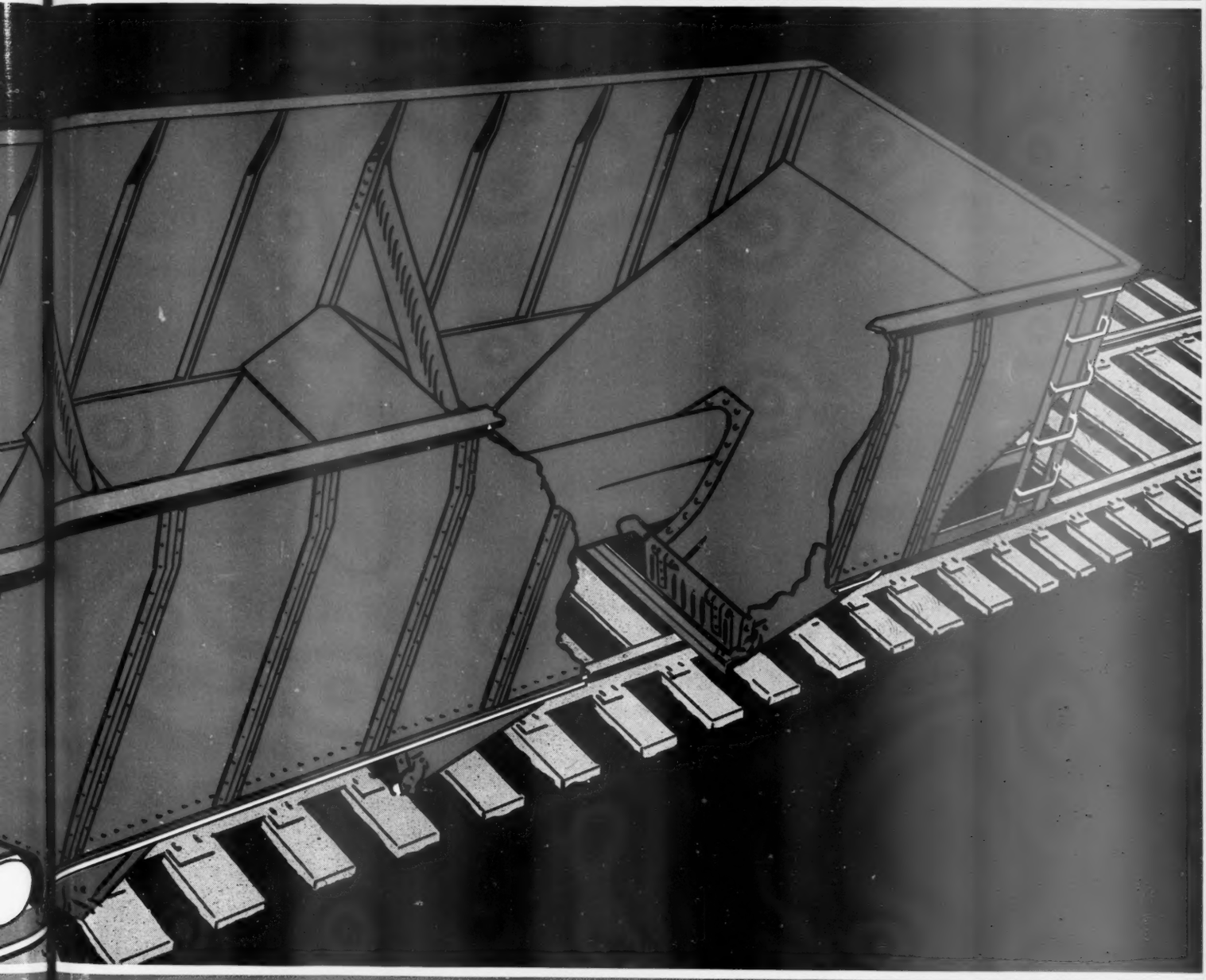
USS Cor-Ten is a low chromium-copper-silicon-phosphorus steel of high tensile strength — great resistance to corrosion; permitting substantial reductions in dead load without any sacrifice of strength.

USS MAN-TEN

Many modern freight and passenger cars have structural members and parts of USS Man-Ten —a medium manganese steel of great strength for application where constant exposure to corrosion is not a governing factor.

cut of freight revenues

HEAVY-DUTY EQUIPMENT



USS SIL-TEN

Well suited for body parts of many types of railroad cars, USS Sil-Ten is a strong structural Silicon Steel for application where great resistance to corrosion and extremely high physicals are not essential.

USS 18-8 STAINLESS

USS 18-8, a Chromium-Nickel Alloy Steel, leads the USS series in adaptability for all uses in which appearance, resistance to corrosion, and unusual physical properties are essential.

USS 12 STAINLESS

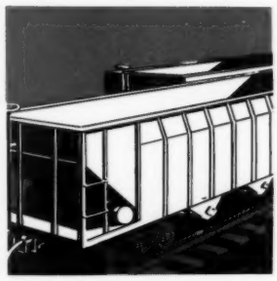
USS 12 possesses high tensile strength, impact and endurance values, and increased resistance to all types of corrosion. Available in all forms—it is adapted to a wide variety of applications on modern rolling stock.

USS HIGH-TENSILE STEELS

Proving their merit on many systems

Self-Liquidating Investment

The railroads using USS High Tensile Steels in car construction have assured themselves that the use of these superior products constitutes a self-liquidating investment. They increase earning capacity and cut dead loads by permitting substantial reductions in weight—with no sacrifice in strength.

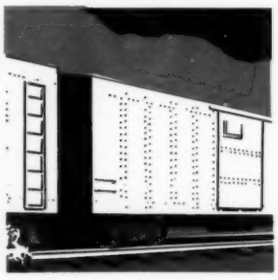


Dead Weight Cut 4½ Tons

The dead weight of this 50-ton box car has been cut—and its revenue capacity increased—4½ tons by the use of USS Cor-Ten Steel welded body construction—without increasing costs. The strength of this car is equal to former conventional steel double-sheathed box cars—and its life will be longer because of Cor-Ten's high resistance to corrosion.

27.5% Weight Reduction on Structurals

This recently completed light-weight box car has its underframe and superstructure built of USS Cor-Ten Steel plates, sheets, shapes and bars with a resulting weight reduction on structurals of 27.5%. The auxiliary reservoir and the single-strength train pipe also are made of Cor-Ten for further weight reductions and greater resistance to corrosion.



On the Streamliners

Many of the notable modern streamline trains and cars have been built of USS 18-8. Available in all forms and in a wide range of properties—this steel can be profitably adapted to many applications in modern train construction.

For decorative work, both interior and exterior, USS Stainless Steels provide enduring beauty.

Modernizing the Steamers

Each of the steels in the USS High Tensile Series has a definite place in the lighter weight car and locomotive construction so necessary in modernizing steam trains to meet the new conditions with faster schedules—added passenger comfort.

Call on the U. S. Steel Corporation Subsidiaries' technical consultants to aid you in solving any problem involving steel and its use.

Where Dependability Is Essential

Running 488 miles daily—and making 39 stops—on a 12-hour schedule—this train proves the unfailing dependability of the USS High Tensile Steels used in its construction. Welding—to which they are ideally adapted—was extensively used in their fabrication. Thus they aid in effecting economies in shop practice as well as in train operation.

USS STEEL

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AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL & WIRE COMPANY
CARNEGIE STEEL COMPANY
COLUMBIA STEEL COMPANY
CYCLONE FENCE COMPANY
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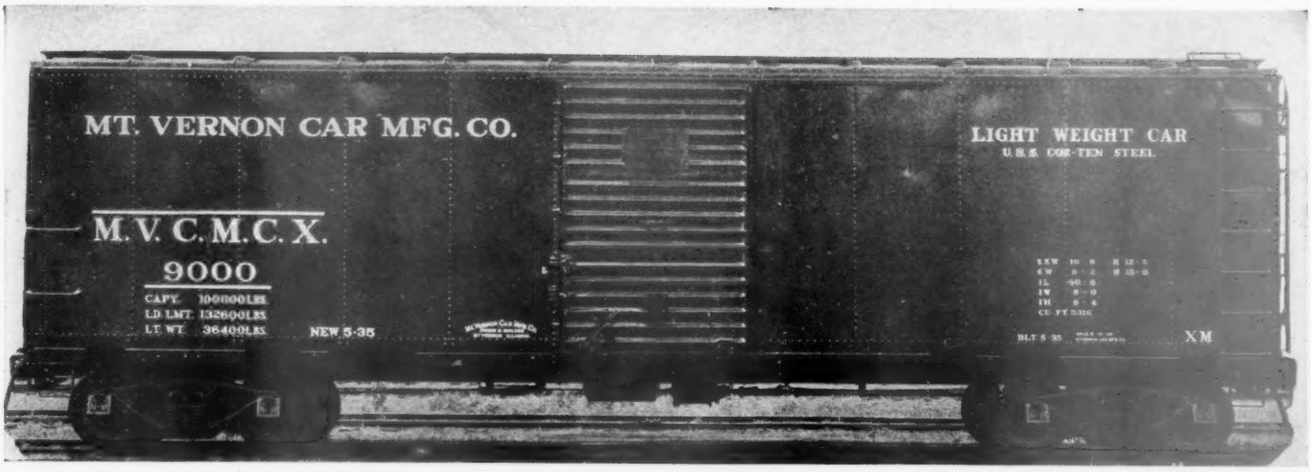

ANSWERING THE DEMAND *for* REDUCED WEIGHT

REDUCTION in weight without affecting the efficiency or safety of rolling stock and equipment has been one of the railroads' biggest problems in the past year.

The Association of Manufacturers of Chilled Car Wheels through constant research and laboratory tests are making it possible for the railroads to meet this demand for reduced weight.

In constructing the Mt. Vernon Car No. 9000, weighing but 36,400 lb., a saving of 680 lb. in weight for the car was made through use, by special permission of the A.A.R. Committee on Wheels, of experimental re-annealed Chilled Car Wheels weighing but 665 lb. each, mounted on A.A.R. standard Class D axles with 5½" x 10" journals.

Meeting this demand for reduced weight is another reason why Chilled Car Wheels are used wherever railroads are run.

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332 S. MICHIGAN AVE. CHICAGO, ILLINOIS

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Can be applied in a jiffy

E-Z-ON JOURNAL BOX LIDS

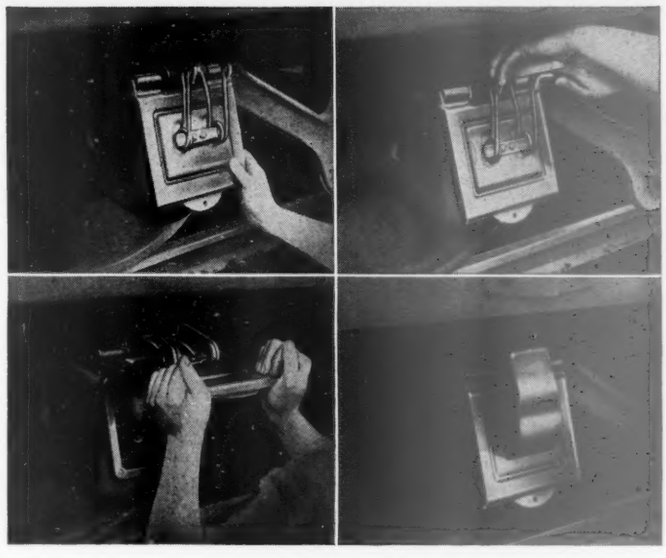
No Tools Required

E-Z-ON is a time saver for the car inspector at interchange points and for the repairman in the shop.

It provides a complete covering of the important spring and gives maximum protection to the journal box.

The three parts, like all "Railway" Products, are manufactured to provide long dependable service with minimum attention and replacements.

All boxes with A.R.A. lugs can be fitted.



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RAILWAY STEEL SPRING DIVISION
30 CHURCH STREET · NEW YORK · N·Y·

Cardwell Westinghouse Co.

CAR PROTECTION ENGINEERS

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FRICTION
BOLSTER
SPRING

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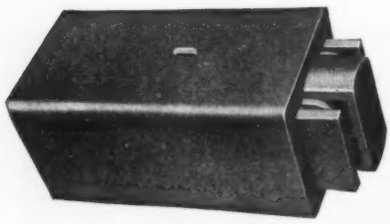
To assist railways to reduce damage to tracks, cars and lading and to promote safety of operation, by furnishing appliances which control vertical and horizontal shocks.

• OUR POLICY

Continuous development and improvement of our appliances through research, and testing.



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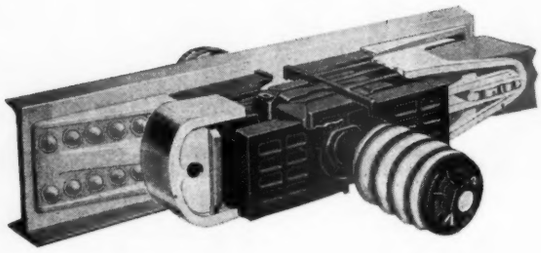

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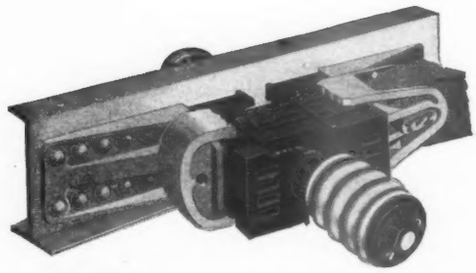

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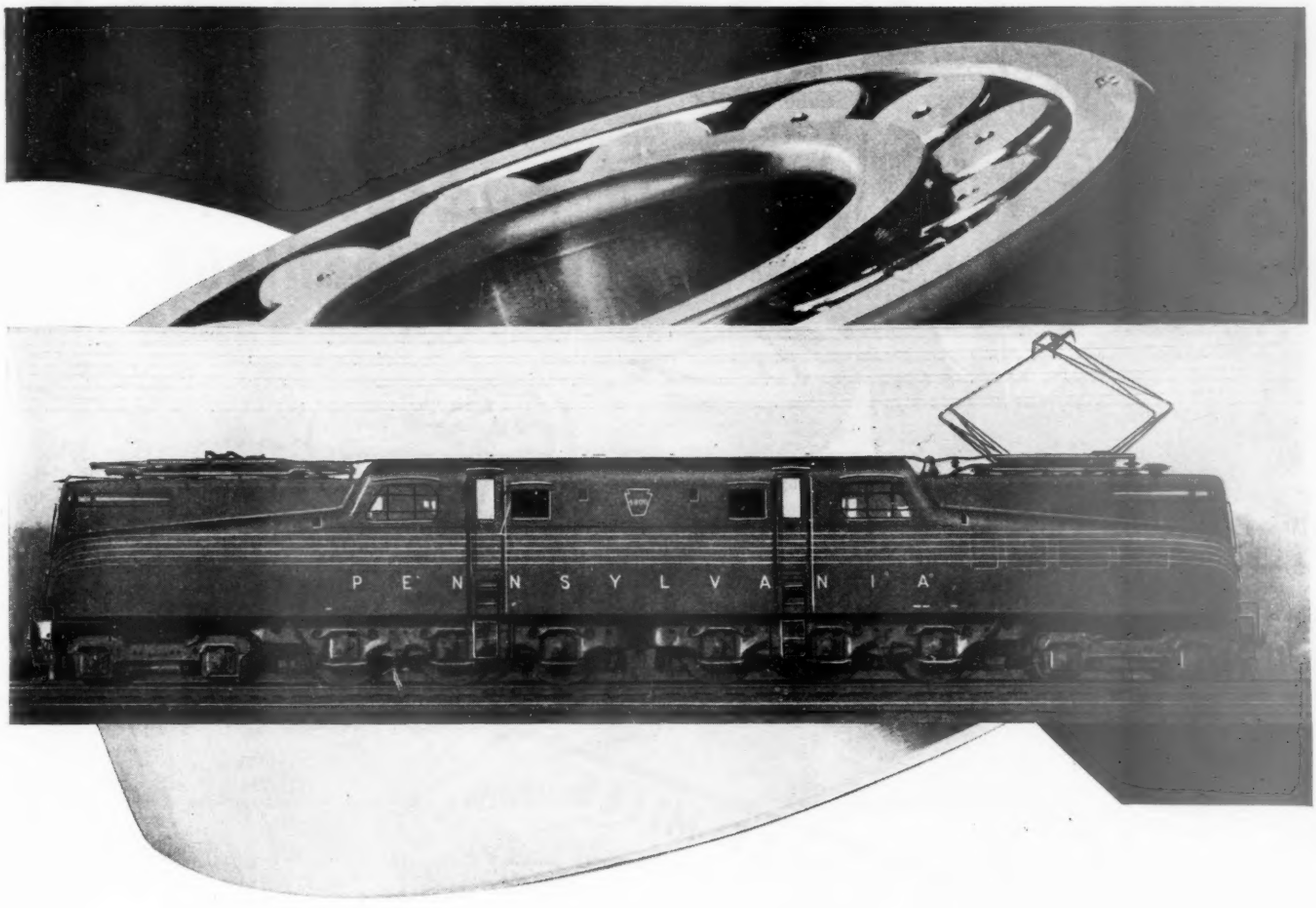

PENNSYLVANIA ELECTRIC LOCOMOTIVES

SKF takes pride in its contribution to this big electrification program, for SKF Spherical Self-Aligning Roller Bearings are on the journals of the first lot of electric locomotives built by the Pennsylvania in 1929 and also on some of the latest type GG1 locomotives, one of which is shown above.

Because of their outstanding record, SKF Cylindrical Roller Bearings have been used on the traction motors of many of these electric locomotives. The use of roller bearings is reflected in the better performance of the locomotive itself.

SKF INDUSTRIES, INC., Front Street and Erie Avenue, Philadelphia, Pa.

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JOURNAL BEARINGS

3464

430% INCREASE

IN MILEAGE BETWEEN BOILER WASHINGS . . .

Just before the adoption of the NALCO System of Water Treatment, back in 1931, a well-known railroad was compelled to wash 1704 boilers for each 1,000,000 miles of total locomotive travel. Now they wash only 322 boilers for that same amount of total locomotive travel. Their cost of boiler material per 1,000,000 locomotive miles was $3,450—now it is $480.

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We shall be glad to make a NALCO survey of feed-water conditions and treatment on your line. This will put you under no obligation. Write us.

•

* Details of this report made by disinterested outside source furnished upon request.

NATIONAL ALUMINATE CORPORATION
6216 WEST 66th PLACE ▲ CHICAGO, ILLINOIS

NALCO SYSTEM
OF WATER TREATMENT

A SMALL SPRING...

But a very important part of a Pyle-National Generator

In the very heart of the familiar Pyle-National generator is a small spring which holds the steam valve down against the tapered seat. It's a small but important part, this Chrome-Vanadium Steel Spring. It holds the valve with sufficient pressure to prevent leakage through the seat . . . it functions hour after hour, day after day, in superheated steam, at temperatures up to 600 to 650 degrees F. In addition, it is sometimes subjected to corrosive conditions arising from the boiler feed water.

Various types of spring steels, some of them electro-plated, were tried in this service but failed to stand up. For several years now, Pyle-National has used springs of Chrome-Vanadium Steel and hundreds of these Chrome-Vanadium springs are giving dependable service in the Pyle-National locomotive generators...and also in Pyle-National generators in the oil producing, oil refining and other industrial services.

If you are interested in springs of any type, for any kind of service, let us tell you what Vanadium in Spring Steels will do.

VANCORAM

FERRO-ALLOYS *of vanadium, silicon, chromium, titanium, and silico-manganese, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.*

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VANADIUM STEELS

for strength, toughness and durability

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ECONOMICS OF TRANSPORTATION

By D. PHILIP LOCKLIN

Economist for the Interstate Commerce Commission, and Assistant Professor of Economics, University of Illinois

This book is a study of the economic aspects of transportation. It considers not only the internal economic characteristics of the industry out of which many problems have arisen, but also the broader relationship between the transportation industry and the economic life of present-day society.

Descriptive material has been reduced to the minimum. Economic questions and problems are given extended treatment and analysis. A substantial portion of the book is devoted to problems of rate making. There is a chapter on the relation of freight rates to prices, and a chapter on the relation of freight rates to the location of industry, which includes the effect of rates on market areas. The policies of the Interstate Commerce Commission are analyzed for definite principles and policies discernible in its decisions.

Of special interest is his discussion of the "weak-and-strong-road problem." Water transportation and motor transport are considered in the light of the conflict of interests with the railroads and the questions of public policy involved.

The book is carefully documented throughout and presents the most recent government legislation. The author offers no solution to the transportation problem. He has not sought to avoid any controversial questions of major importance and in many instances offers his own opinions, criticisms and suggestions when they may aid in clarifying involved situations.

788 pages, 47 illustrations, 6 x 9 inches, cloth, $4.00.

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MISCELLANEOUS

Railway Supply man well acquainted in Southeastern States opening an office and invites accounts on retainer basis. Address Box 916, RAILWAY AGE, 30 Church St., New York, N. Y.

ASSOCIATION HEADQUARTERS, FIFTH AVENUE, NEW YORK

Organization Secretary, with influential industrial and transportation contacts throughout the U. S., experienced every branch Association activity, opening own office Fall 1935; will provide every facility and service, part time basis. Reply, first instance, F. Madison, Jaques & Company, 202 East 44th St., New York.

RAILROAD HIGHWAY GRADE CROSSING PROTECTION MATERIALS

W. R. Hammock, Superintendent, Arkansas & Louisiana Missouri Railway Company, 9th & Adams Streets, Monroe, La. Sealed bids in duplicate will be received at this office until twelve o'clock noon October 22, 1935, and then publicly opened for furnishing all materials except sand, stone, cement and form lumber for installation of two flashing light signals at the crossing of Louisville Avenue, U. S. Highway 80, with the Arkansas & Louisiana Missouri Railway at Munroe, Ouachita Parish, Louisiana.

Use space here

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BUY GOOD USED FRAMES

Save 50%! *Two* Sets for *One!*

Iron & Steel Products, Inc.
Frank Parker, Pres.
Railway Exchange, Chicago
"SERVICE-Tested" Car Parts

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For Advertisers' Index turn to page 38

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ENGINEERS
Inspection—Tests—Consultation
All Railway Equipment, Structures and Materials
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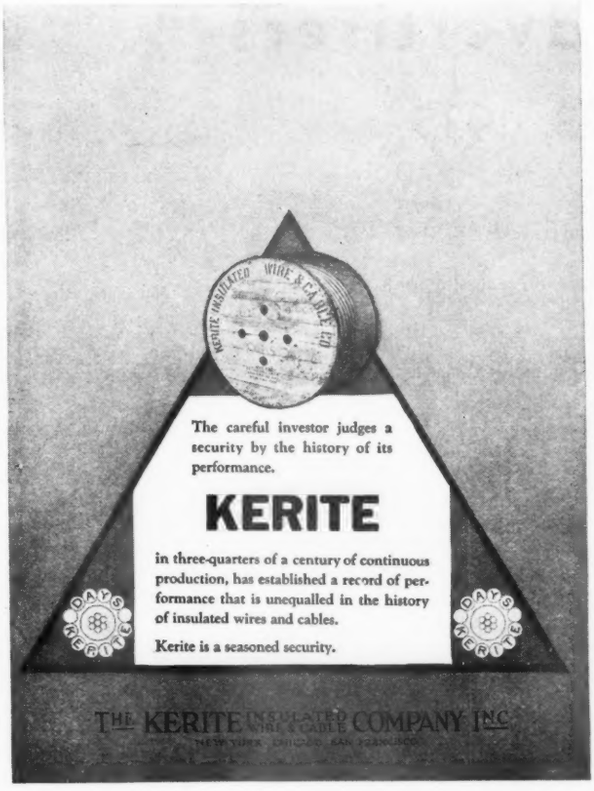
Offices in all principal cities

Your name should appear before the readers of this publication.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KERITE
in three-quarters of a century of continuous production, has established a record of performance that is unequalled in the history of insulated wires and cables.
Kerite is a seasoned security.
DAYS
KERITE
THE KERITE INSULATED WIRE & CABLE COMPANY INC.

WOOD

Lumber & Timbers

By Phillips A. Hayward

Formerly Technical Counsel to the National Committee on Wood Utilization, U. S. Department of Commerce

This is Volume 1 of the Chandler Cyclopedia for the scientific selection, purchase and use of commodities. It was designed for purchasing agents by a former president and secretary of the National Association of Purchasing Agents. The author has served as a wood preservation specialist for a railroad, as a lumber mill operator and as a lumber inspector and buyer. The information is authentic, accurate and complete and any buyer, specifier, user or student of wood will find in it answers to many of his problems.

It tells how to choose the right species of wood for any purpose; how to choose the right size for best delivery and price; how to choose the right grade for best value; how to save money by specifying and ordering correctly; how to handle, store and dry to save waste and preserve lumber; how to know whether you get what you pay for, etc. The cross-index containing 3600 items helps solve any problem of selection, purchase or use of wood in any form, with the aid of photographs, drawings, tables and statistics. 1930. 548 pages, 145 illus., 164 tables and charts, 7¾ x 10½ inches, large readable type, cloth binding.

Was $10.00——Now $4.00

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Simmons-Boardman Publishing Company

30 Church Street New York, N. Y.

Restrain Corrosion's Ruthless Etching

with Bakelite Resin Finishes

ONE of the most important factors in railway maintenance is the continuous fight against corrosion. This stealthy and relentless antagonist swiftly etches its mark of destruction on all poorly protected surfaces. Maintenance engineers should investigate the Bakelite Resin Finishes as they offer possibilities of reducing maintenance costs.

To paints, varnishes and enamels, structural coatings and other finishes for railway service, Bakelite Resins impart these important properties; extreme toughness, lasting flexibility and high resistance to moisture, sunlight, fumes, chemicals and atmospheric grit. Stringent tests, both in the laboratory and on railway bridges, rolling stock, marine equipment and buildings of many types have demonstrated the ability of Bakelite Resins to lengthen the life of protective finishes.

Several paint and varnish manufacturers now formulate railway finishes with Bakelite Resin base. We invite you to investigate the advantages of these coatings for your maintenance work. Write for booklet 24S, "Bakelite Synthetic Resins", containing interesting facts on paint durability.

BAKELITE CORPORATION, 247 Park Avenue, New York
CHICAGO OFFICE, 43 East Ohio Street
BAKELITE CORPORATION OF CANADA, LTD., 163 Dufferin Street, Toronto

BAKELITE

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"The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the capital "B" is the numerical sign for infinity, or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products."

SYNTHETIC RESINS

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ENGINE CASTINGS

STRONG TOUGH
ANTI-FRICTIONAL EASILY MACHINED

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LANTERNS and National Carbide V. G. Flarelights —the highest development in carbide lighting equipment.

Lanterns with blue rear light for car inspection — with red rear light for motor car headlights and signal lights — handy lamps and portable lights for track maintenance —standard on many railroads.

Y-199 Handy Light

WLI-CI Lantern

NATIONAL CARBIDE SALES CORP.
LINCOLN BLDG., 60 EAST 42ND ST., NEW YORK, N.Y.

EDGEWATER STEEL COMPANY
PITTSBURGH, PA.

Details of our products appeared in the following issues of *Railway Age* during 1933, 1934, 1935:
1933—June 3, 24—July 1, 22—Sept. 2—Oct. 7, 28—Nov. 4—Dec. 2
1934—Jan. 6, 27—Feb. 17—March 3—April 7, 21—May 5, 19—June 2, 9, 16, 30—October 13—November 3—Dec. 1.
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STRUCTURAL STEEL—RIVETED AND ARC WELDED
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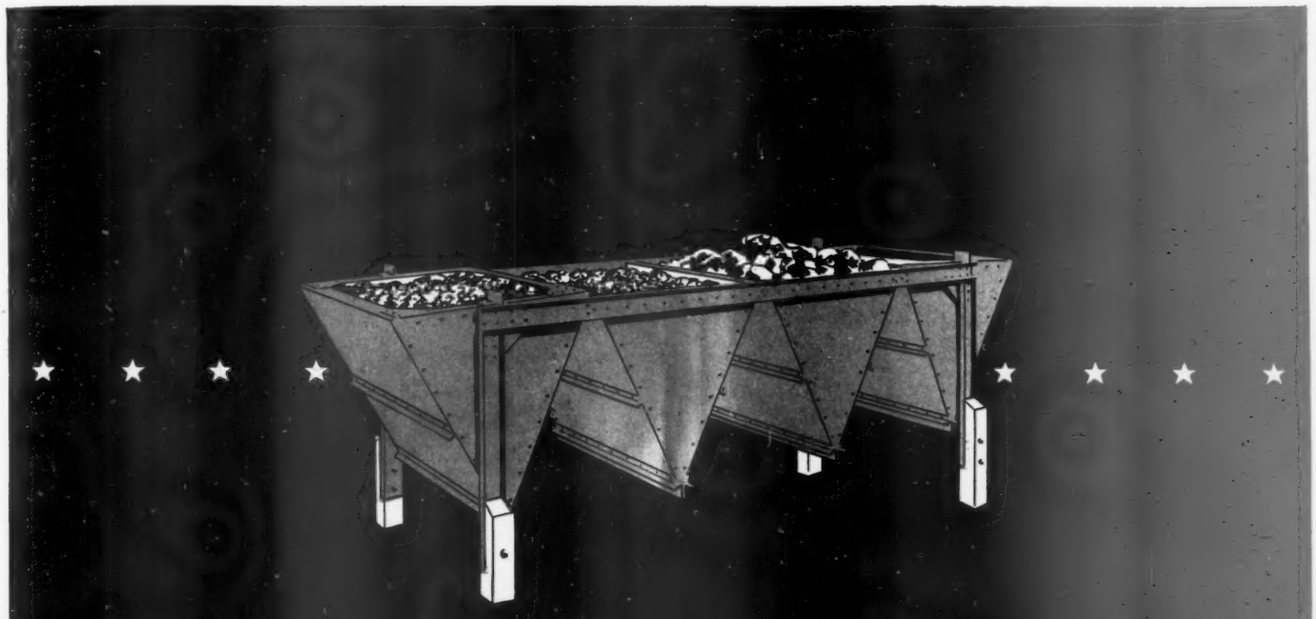


ANOTHER YEAR'S EVIDENCE THAT THE WAY TO DEFEAT CORROSION IS TO STARVE IT TO DEATH

ALCOA

● Another full year of exposure for our test-hoppers! Three of these hoppers are filled with coal. All four have had three hundred and sixty-five more days of uninterrupted exposure to all kinds of weather.

The whole purpose of this still-continuing test is to give visual and measurable demonstration to a fact that came out of the chemistry book in the first place.

That fact is: The sulfur content of coal (we're using regular Illinois, West Virginia, and Pennsylvania Bituminous) has no appetite for Aluminum.

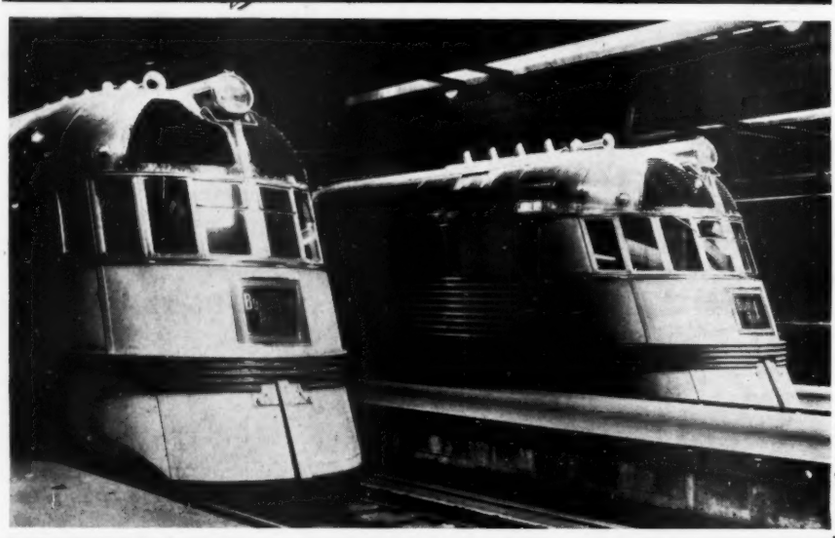
Again we report (see our advertisement in this publication November 17, 1934) that the corrosive effect of these coals on the Aluminum plate is uniformly negligible. It is definitely indicated that with ordinary use a period of twenty years or more will not materially affect the life of these plates. We are continuing the test with new, unleached coal, from the same fields, in the same hoppers.

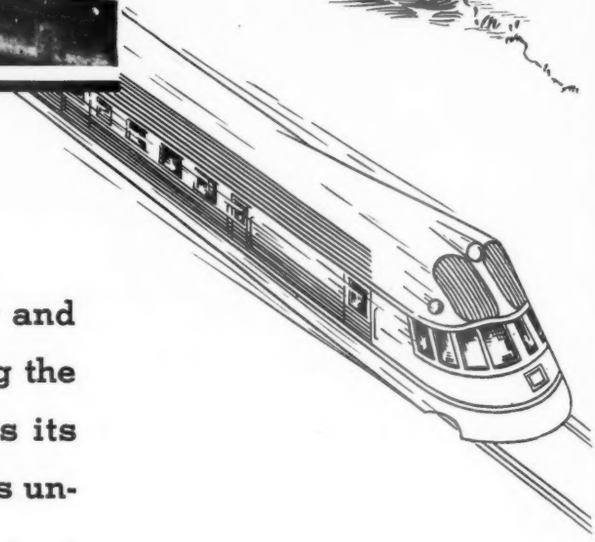
It is reasonable to expect that Alcoa Aluminum will triple the present average life expectancy of hopper car bodies. Also that maintenance costs resulting from depreciation caused by corrosion will be materially decreased.

The incomparable lightness of Aluminum construction is, of course, a cost-saving story in itself. May we tell you more about it? ALUMINUM COMPANY OF AMERICA, 1878 Gulf Building, Pittsburgh, Pa.

ALCOA ALUMINUM

Swift as an Eagle-Safe as its Aerie





As an eagle confidently skims the sky and swoops unfalteringly to its nest among the crags, so the Zephyr securely wings its westward way over the rails, and glides unerringly to the terminus in safety. » » »

High-speed transportation, adequately safeguarded by the Westinghouse HSC Brake equipment, is provided by the "Burlington" light-weight articulated trains—The Zephyrs.

WESTINGHOUSE
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